Official Register of Harvard University

1984–85

Harvard School Of Public Health

HARVARD SCHOOL OF PUBLIC HEALTH

DIRECTOR OF ADMISSIONS

677 Huntington Ave.
Boston, Massachusetts 02115
Cable Address: Harvhealth
617-732-1030

DATE: March 15, 1985

TO: Prospective Applicants

FROM: The Admissions Office

RE: Deadlines

The application deadline has been extended to May 1, 1985. Your application must be complete by May 31, 1985.

Please be advised that April, 1985 is the last test date from which we will receive score reports from the Test of English as a Foreign Language or the Graduate Record Examination in time to guarantee that your application can be reviewed for Fall 1985 admission.

PLEASE NOTE: If you are applying to the doctoral program in Health Policy and Management you must have your application in and completed by March 1, 1985.

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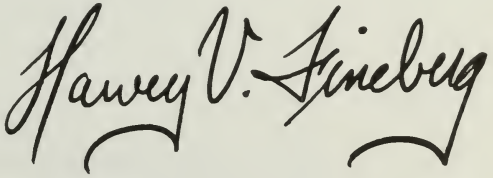
COVER: *Dr. John Little, Professor of Radiobiology, far right, with David Yandell and Yoshio Kano; Dr. Michele Jungery, Assistant Professor of Tropical Public Health; and Dr. Joseph Brain, Professor of Physiology.*

A Note from the Dean

Public health is concerned with preserving and enhancing the health of populations. The scope of public health is extensive, as reflected in the range of courses, departments, centers, programs, and facilities described in this *Register*. The interests and expertise of faculty at the School are similarly diverse, extending across biological sciences, social sciences, numeric disciplines, and more.

This *Register* contains a wealth of information about educational opportunities at the School of Public Health. Though we have endeavored to make it accurate and comprehensive, it is necessarily an incomplete description of the learning experience available at the School. The School of Public Health is a place to acquire new skills; a place to enrich one's professional perspective by interacting with fellow students as well as with faculty; a place to gain a more sophisticated understanding of health sciences, health issues and problems and their possible solutions; a place to test one's ideals, objectives and imagination against the imposing array of biological, individual, organizational, economic, and political barriers to improved public health.

The principal educational mission of the School is to prepare leaders in professional service and research aimed at promoting the health of populations. We believe we are engaged in a vital enterprise of central importance to society. We welcome those who join us at the School to share in that sense of excitement and challenge.



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September 5, 1984

Official Register of Harvard University

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Every effort is made to ensure the information contained in this *Register* is accurate at the time of publication. However, the School of Public Health reserves the right to make changes without notice in tuition and fees, admission and degree requirements, courses of instruction, and other information contained herein.

As a matter of policy, Harvard University does not discriminate among applicants and students in admissions, educational policies, scholarship and loan programs, and athletic and other programs on the basis of race, religion, sex, national origin, color, creed, handicap, age, sexual orientation, marital or parental status, or status as a Vietnam era or disabled veteran.

The Harvard School of Public Health is accredited by the Council on Education for Public Health.

Credits

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Academic Calendar 1984–85

September 10, Monday
Orientation and registration for new international students: 10:00 A.M., International House, 203 Park Drive.

September 11, Tuesday
Registration for new U.S. students: G-Level, Kresge Building, 10:30 A.M. - 2:00 P.M., according to first letter of last name:

A - F 10:30 A.M.
G - L 11:30 A.M.
M - S 12:30 P.M
T - Z 1:30 P.M.

Opening Session for all new students:
2:00-4:00 P.M., G-1 auditorium, Kresge Building.
All new students are required to attend the opening session and to be present for the registration and orientation period (Tuesday - Friday).

September 12, Wednesday
Registration for all returning students:
G-Level, Kresge Building, 9:30 A.M.-11:45 A.M. according to first letter of last name:

A - E 9:30 A.M.
F - K 10:15 A.M.
L - R 11:00 A.M.
S - Z 11:45 A.M.

Students who fail to register on the appointed dates will have a $25 late fee per week assessed on their fall term bills. The period between the opening sessions and September 14 will be devoted to orientation lectures, individual conferences with faculty members and selection of courses of study.

September 13, Thursday, and September 14, Friday
Course registration must be completed by 6:00 P.M. Friday.

September 17, Monday
First period "a" and "ab" courses begin.

September 28, Friday
Last day to cross-register for fall term "a" and "ab" courses.

October 1, Monday
Last day to register for fall term for late acceptances.
Last day to cancel registration with refund of term bill payment.

October 8, Monday
Columbus Day, a holiday.

October 9, Tuesday
Last day to drop/add and change grading option for "a" and "ab" period courses by 3:00 P.M. without charge.

October 12, Friday
Last day to drop or change grading option for cross-registered students by 3:00 P.M.

November 7, Wednesday
Bound, signed theses due in the Registrar's Office by 3:00 P.M. for doctoral students applying for November degrees.

November 9, Friday
First period ends.

November 12, Monday
Veterans' Day, a holiday.

November 13, Tuesday
Second period "b" and "bc" courses begin.
Students are allowed one drop/add petition for "b" and "bc" courses without charge until 3:00 P.M. on November 27.

November 21, Wednesday
Thanksgiving recess begins at 5:30 P.M.

November 26, Monday
Thanksgiving recess ends at 8:00 A.M.
Deadline for filing degree applications for degree in March 1985.
Deadline for applications for nonresident doctoral status for spring term.

November 27, Tuesday
Last day to drop/add and change grading options for "b" and "bc" period courses by 3:00 P.M.
Last day to register for "b" and "bc" courses by 3:00 P.M.

December 14, Friday
Spring registration materials available in Registrar's Office for continuing students. Course registration must be completed by January 11, 1985.

December 19, Wednesday
Winter recess begins at 5:30 P.M.

January 3, Thursday
Winter recess ends at 8:00 A.M.

January 11, Friday
Course registration must be completed by 6:00 P.M.

January 18, Friday
Second period courses end.
Deadline for completing previous spring term courses graded as INCOMPLETE. Term break recess begins at 5:30 P.M.

January 21, Monday
Martin Luther King, Jr.'s Birthday, a holiday.

January 22 through January 25
Supervised special studies or field observations: "e" period.

January 28, Monday
Term break recess ends at 8:00 A.M.

January 28, Monday
Third period "c" and "cd" courses begin.
Registration for students not enrolled during the fall term. Students should come in person to the Registrar's Office between 10:00 A.M. and 3:00 P.M.

February 8, Friday
Last day to register for spring term for late acceptances.
Last day to cross-register for spring term or to cancel registration with refund of spring term payment.

February 13, Wednesday
Bound, signed theses due by 3:00 P.M. in the Registrar's Office for doctoral students applying for March degrees.

February 18, Monday
Washington's Birthday, a holiday.

February 19, Tuesday
Last day to drop/add and change grading options for "c" and "cd" courses by 3:00 P.M.

February 22, Friday
Last day to drop or change grading options for cross-registered students by 3:00 P.M.

March 22, Friday
Third period ends.
Spring recess begins at 5:30 P.M.

March 25 through March 29
Supervised special studies or field observation: "f" period.

April 1, Monday
Spring recess ends at 8:00 A.M.
Fourth period "d" courses begin.
Students are allowed one drop/add petition for "d" courses without charge until 3:00 P.M. on April 12.
Deadline for filing degree applications for degree in June.

April 12, Friday
Last day to drop/add and change grading options for "d" courses by 3:00 P.M.
Last day to cross-register for "d" courses by 3:00 P.M.

April 29, Monday
Last day to file petition for nonresident doctoral status for the academic year 1985-86.

May 24, Friday
Fourth period ends.
Deadline for registration and tutorial forms for HSPH summer tutorials. Deadline for completing fall term courses graded as INCOMPLETE.

May 27, Monday
Memorial Day, a holiday.

May 28 through June 5
Post class period.

May 29, Wednesday
Bound, signed theses due by 3:00 P.M. in the Registrar's Office for doctoral students applying for June degrees.
Grades due in Registrar's Office by 5:00 P.M.

June 3, Monday
Degree voting faculty meeting.

June 6, Thursday
Commencement.

August 12, Monday
Deadline for filing degree applications for degree in November 1985.

Degree Calendar

For a degree to be awarded	Degree applications due in Registrar's Office on Monday	Bound theses due by 3:00 P.M. in the Registrar's Office on Wednesday
November 20, 1984	August 13, 1984	November 7, 1984
March 19, 1985	November 26, 1984	February 13, 1985
June 5, 1985*	April 1, 1985	May 29, 1985

*Degrees conferred June 6, 1985—Commencement

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(This Board is commonly known as the Corporation.)

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Roderick Martin MacDougall, A.B., Treasurer of Harvard College

Robert Shenton, A.B., M.B.A., Ph.D., Secretary to the Corporation

Harvey V. Fineberg, Dean of the Faculty of the School of Public Health, left, and Elkan R. Blout, Dean for Academic Affairs.

Administrative Officers

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John Rouben David, A.B., M.D., A.M. (hon.), Director of the Center for the Prevention of Infectious Diseases

Margaret Elizabeth Drolette, A.B., M.P.H., Ph.D., Chief Coordinator of the Master of Public Health Program

Howard Stanley Frazier, Ph.B., M.D., Director of the Institute for Health Research

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Dade William Moeller, S.B., S.M., Ph.D., Director of the Office of Continuing Education

Richard Redding Monson, S.M., M.D., S.M. in Hyg., Director of the Educational Resource Center for Occupational Health and Safety

Jay Andrew Winsten, A.B., Ph.D., Director of the Office of the Health Policy Information

Dr. Richard Monson, Professor of Epidemiology.

Dr. Margaret Drolette, second from left, Dr. Alan Sheldon, and Dr. Mark Boyer, coordinators of the MPH Program, with staff assistants Ruth Steinbrecher, far left, and Janie Cordell.

Facing page, Dr. Isabelle Valadian, Professor of Maternal and Child Health and Chairman of the Department, with Dr. Omar Hassam Kasule.

Degree Requirements

The School of Public Health offers programs leading to the graduate degrees of *Master of Public Health* (M.P.H.), *Doctor of Public Health* (Dr.P.H.), *Master of Occupational Health* (M.O.H.), *Master of Science* in a specified field (S.M. in . . .), and *Doctor of Science* (S.D.). The general degree requirements and the respective requirements for admission are discussed in the following sections.

Master of Public Health

The program leading to the Master of Public Health degree consists of one academic year of study designed to prepare professionals for careers in public health practice. Through the core curriculum, the program provides a broad background in various disciplines basic to public health. Through the choice of elective courses, students may acquire more breadth of knowledge or may pursue in some depth one or more areas of particular relevance to their career goals. The M.P.H. degree program may serve as a required academic year for residency training (see page 25).

Requirements for Admission

Applicants to the M.P.H. program must satisfy the Committee on Admissions and Degrees as to their academic ability, the relevance of their previous education and experience, and their overall qualifications for graduate professional education in public health. Ordinarily, an applicant should hold a doctoral degree in medicine, dentistry or veterinary medicine. Consideration is also given to applicants who hold doctoral degrees in biology, behavioral sciences, other natural sciences and social sciences, or law, economics, engineering, and certain related fields regarded by the School as appropriate background for entrance into the public health profession. Applicants who hold an earned doctoral degree are urged to submit scores from the Aptitude Test of the Graduate Record Examination (GRE) or other aptitude tests such as the Law School Admission Test (LSAT), the Medical College Admission Test (MCAT) or the Dental Aptitude Test (DAT), if available. However, applicants to the Department of Health Policy and Management who hold a doctoral degree *must* submit scores from one of these standardized tests.

Consideration for admission to the M.P.H. program is given also to an applicant who holds a master's degree in a field related to public health such as nursing or social work, with a highly distinguished academic record, and substantial professional experience (usually at least three years in an administrative position of responsibility). These applicants must be able to demonstrate sufficient knowledge and competence to satisfy the Committee on Admissions and Degrees as to their qualifications for professional public health education and must submit scores from the Aptitude Test of the Graduate Record Examination. Scores from the GRE Aptitude Test should be no more than five years old.

Applicants from countries where English is not the language of instruction must submit a score from the Test of English as a Foreign Language (TOEFL). Ordinarily, the TOEFL score must be 550 or better before the applicant can be considered for admission.

If a student who is enrolled in the M.P.H. program wishes to continue at the School after completing the M.P.H., he or she may consider applying for a Master of Science or doctoral program in any of the departments which offer such programs for which he or she meets the requirements. Interested students should refer to the section on admissions for procedures and application deadlines.

Requirements for the Degree

An M.P.H. degree candidate must spend one academic year in residence at the University and must successfully complete courses totaling a minimum of 40 credit units. Students will be encouraged to take a total of 45 to 50 credit units.

Candidates for the M.P.H. degree are expected to complete the requirements in one academic year of full-time study. In rare instances, upon written request to the Committee on Admissions and Degrees, a student may be allowed to complete the program over a period of two academic years. The M.P.H. core courses must be completed in the first year.

Students who have taken courses at the School prior to entrance into this degree program may be able to use those courses to satisfy specific M.P.H. or departmental course requirements, but they must still complete a minimum of 40 credit units as degree candidates. In any event, students are required to pay one full year of tuition.

The Core Curriculum

The core curriculum, required of *all* M.P.H. degree candidates, is designed to provide a fundamental knowledge of the major areas of public health. Students must take the four core courses which cover the environment, quantitative methods and health administration and management. In addition, students select one course that uses the case method to integrate the various disciplines of public health. The core courses are:

ESP 201a or 201c Principles of Environmental Health I (2.5 credit units) plus either 202b Principles of Environmental Health II (2.5 credit units) or 203d Principles of Environmental Health III (2.5 credit units)

BIO 201a,b Principles of Biostatistics (5 credit units)

EPI 201a Epidemiology in Public Health (2.5 credit units)

HPM 221a,b Managing Health Delivery Organizations (5 credit units)

AND a case studies course. A list of case studies courses will be provided before registration.

Ordinarily, the core courses represent less than half the total number of credit units recommended for the degree, thus allowing for flexibility in the program. Descriptions of each course appear in the section, *Courses of Instruction*.

Master of Public Health Program Office

Chief Coordinator: Dr. Drolette
Coordinators: Dr. Boyer and Dr. Sheldon

The coordinators have day-to-day responsibility for the M.P.H. degree program, oversee the core curriculum and serve as the M.P.H. Subcommittee of the Committee on Admissions and Degrees. They meet regularly with the Master of Public Health Program Committee, composed of a faculty representative of each department at the School, and representatives of students, alumni and the School administration. The M.P.H. Program Office, located in the Office of Student Affairs, serves as a departmental office for students in the General Program, and provides a central source of information about the M.P.H. degree program to all students and applicants.

Departmental Concentrations

The M.P.H. is an interdisciplinary degree and does not carry a departmental designation. Many students have specialized goals and choose to take most of their elective courses in one department. They often prefer to concentrate in that department. Departments differ in their expectations of M.P.H. degree candidates. Some advise them to take a specific set of courses over and above the M.P.H. core curriculum, while others determine students' needs on an individual basis. For further information about a specific departmental concentration, please check with the department.

The General Program

The General Program, under the direction of the coordinators of the M.P.H. program, recognizes that many students seek a broader view of public health than that which a departmental affiliation offers. Students in the General Program may choose their elective courses from a variety of courses offered by the School of Public Health and other faculties at Harvard as well as appropriate courses offered at M.I.T. Faculty advisers are assigned with each student's background and interests in mind. Members of the M.P.H. Committee serve as advisers to most of the students in the General Program. Even within the General Program, it is possible for a student to concentrate to some extent in a particular discipline through the appropriate choice of electives.

Combined Degree Programs

Students currently enrolled in an M.D., D.M.D., D.D.S., or D.V.M. program may apply for admission to the M.P.H. program, provided that a combined program can be arranged that meets the approval of both the Committee on Admissions and Degrees at the School of Public Health and the institution from which the doctoral degree is being earned. Students usually apply in their second or third year of medical, dental or veterinary school for enrollment in their third or fourth year. Requirements for the M.P.H. degree (described on page 17) are the same for students in the combined degree program as for all other M.P.H. degree candidates. Students enrolled in a combined degree program with the M.P.H. will receive the M.P.H. upon successful completion of both degree programs and conferral of the doctoral degree.

Doctor of Public Health

The Doctor of Public Health is an advanced professional degree for those who intend to pursue academic or research careers in public health, including administrative, planning or evaluation roles in public health practice. The degree is granted on successful completion of an approved program of independent and original investigation in a special field of public health and the presentation of the results of this research in an acceptable thesis.

Requirements for Admission

An applicant for admission to candidacy for the Doctor of Public Health degree normally must be a graduate of an approved school of medicine, dental medicine or veterinary medicine. Depending on the intended field of specialization, consideration may also be given to a candidate who holds an advanced degree in one of the disciplines basic to public health. In addition, the applicant must hold, or be in progress toward, the degree of Master of Public Health, or its equivalent, from an approved institution.

Applicants must be able to satisfy the Committee on Admissions and Degrees as to their overall qualifications for doctoral study at the School and must demonstrate potential ability to undertake original investigation in a special field. Scores for the Aptitude Test of the Graduate Record Examination must be submitted by all applicants who do not hold an earned doctoral degree and should be no more than five years old.

Applicants who hold an earned doctoral degree are urged to submit aptitude scores from the GRE, or other tests such as LSAT, MCAT or DAT, if available. Applicants to the Department of Health Policy and Management, however, *must* submit the GRE, except physicians or dentists, who may submit the MCAT or DAT.

Requirements for the Degree

Formal requirements for the Doctor of Public Health degree are the same as those for the Doctor of Science degree. A brief summary of these requirements appears on page 24.

Master of Occupational Health

The program leading to the Master of Occupational Health degree is designed to provide physicians with postgraduate training in the public health disciplines relevant to preventing occupational disease and injury. This one-year degree program is usually taken as part of a two-year approved residency in occupational medicine. Please refer to the Occupational Medicine section under the listing for the *Educational Resource Center for Occupational Safety and Health.*

Requirements for Admission

Candidates must be graduates of an approved school of medicine and must satisfy the Committee on Admissions and Degrees as to their scholastic ability to study at the graduate level. Students from the United States should have completed an internship or residency of at least 12 months in a hospital approved by the American Medical Association. Applicants are urged to submit scores from the Medical College Admissions Test (MCAT) or the scores of the Aptitude Test of the Graduate Record Examination (GRE), if the latter are available.

Requirements for the Degree

Candidates for the M.O.H. degree must spend one academic year in residence at the University and must successfully complete a program of at least 40 credit units, comprising both required and elective courses.

All candidates are expected to take the following courses unless they can demonstrate equivalent preparation:

1. BIO 201a,b, *Principles of Biostatistics* (5 credit units)
2. BIO 202c,d, *Statistical Methods for Epidemiologic Research* (5 credit units) or BIO 203c,d, *Statistical Methods in Experimental Research* (5 credit units). Not required, but strongly recommended.
3. ESP 231c,d, *Policy Issues in Occupational Health* (5 credit units) or equivalent
4. ESP 232c,d, *Introduction to Occupational Medicine* (2.5 credit units)
5. ESP 233c, *Industrial Toxicology* (2.5 credit units)
6. ESP 234d, *Basic Problems in Occupational Health* (2.5 credit units)
7. ESP 251a, *Health Hazards of Manufacturing Processes* (2.5 credit units)
8. ESP 252b, *Introduction to Industrial Hygiene* (2.5 credit units)
9. EPI 201a, *Epidemiology in Public Health* (2.5 credit units)
10. EPI 202b, *Principles of Epidemiology I: Elements of Study Design and Data Analysis* (2.5 credit units) or EPI-ESP 215c,d, *Environmental and Occupational Epidemiology* (2.5 credit units)
11. TOX 204a, *Introduction to Principles of Toxicology* (2.5 credit units)

The total number of credits in required courses is 30. Additional courses may be selected from the curriculum approved for residencies in occupational medicine.

Master and Doctor of Science

The School offers programs leading to the degrees of Master of Science in designated fields of concentration and Doctor of Science. The prospective applicant should note that in some areas the Master of Science program is intended primarily or wholly as preparation for doctoral study; applicants are screened for their interest in, and potential for, doctoral work, and the majority of students continue toward the Doctor of Science degree. In other areas, the Master of Science is viewed primarily or wholly as a professional degree; while a small percentage of students may continue for the doctorate, the majority discontinue study upon receipt of the S.M. degree. Finally, students in still other areas are divided almost equally between those who pursue the Doctor of Science degree and those who discontinue their studies upon receipt of the S.M. degree.

Occasionally, a student may be admitted to a master's program or to candidacy for a doctoral degree in more than one of the disciplines, if the program meets the requirements of the respective departments or programs involved. In such instances, the degree conferred specifies the areas.

Because there is considerable variability among the S.M. and S.D. programs in different fields, both in their overall goals and their specific admission and degree requirements, applicants are urged to consult the program descriptions which provide basic information in specific areas. Additional information may be obtained by contacting the respective departments or programs, as indicated in the degree designation.

Master of Science in Specified Field

In general, the programs leading to the degree of Master of Science in a specified field of concentration are designed for students with interests in the scientific basis of public health and preventive medicine. The degree is granted upon fulfillment of a program of advanced work in the public health disciplines represented by departments and certain programs in the School. Students may be admitted to either a one- or two-year master's program, depending upon the requirements of the particular program. Information about requirements for one- and two-year programs in various areas is included in the program descriptions.

Requirements for Admission

Applicants to Master of Science degree programs must satisfy the Committee on Admissions and Degrees as to their overall qualifications and promise for successful graduate study at the School. Applicants must also satisfy the department or program to which admission is sought that they have an adequate academic and/or professional background appropriate for specialization in that field.

Conditions of eligibility for one-year or two-year programs vary with the area or department in which a student wishes to specialize. Prospective applicants should consult program descriptions for more specific information.

Generally, eligibility for admission to a one-year program is limited to graduates of approved schools of medicine, dentistry or veterinary medicine, or to applicants who have earned doctoral or, for some programs, master's degrees in fields acceptable to the department(s) to which admission is sought. Applicants holding master's degrees may be considered for admission to one-year or two-year programs, depending upon their prior educational and professional background and upon the particular requirements of the program to which they wish to apply.

An applicant holding a baccalaureate degree is normally considered for admission to a two-year program, in order to complete the requirements for a Master of Science degree. For a few programs, including industrial hygiene, air pollution control and radiological health, applicants may be considered for a one-year program if they hold a bachelor's degree with adequate scientific and engineering training and if they have had at least two years of relevant professional experience in the field of specialization.

Occasionally, a year or more of appropriate graduate work in an approved institution may enable a student to fulfill two-year program requirements in one year. In some cases, however, program requirements are such that a student must spend one-and-a-half or two years in residence in order to complete the necessary courses, regardless of prior training and experience.

All candidates for admission to a Master of Science program who do not hold an earned doctoral degree must submit scores from the Aptitude Test of the Graduate Record Examination. Applicants who hold an earned doctoral degree are urged to submit scores from the GRE or other tests such as the Law School Admission Test (LSAT), the Medical College Admission Test (MCAT) or the Dental Aptitude Test (DAT), if available.

The GRE is required for *all* applicants to the Department of Health Policy and Management except lawyers, physicians, dentists, and law, medical or dental students who may submit the LSAT, MCAT or DAT scores.

Applicants are advised to take the Graduate Record Examination no later than the December test administration date. In order to expedite the admissions process, applicants who have taken the Graduate Record Examination in a prior academic year are advised to send a photocopy of their own GRE "Report to the Candidate" when returning their completed application form. GRE scores submitted should be no more than five years old. An official score report must be received from the Educational Testing Service before final action will be taken on the application. Additional information concerning the Graduate Record Examination requirement is included in the instructions accompanying the application form.

Requirements for the Degree

Students admitted to a one-year program must spend a minimum of one academic year in residence at the University and must successfully complete a program of at least 40 credit units. Students admitted to a

two-year program must spend two academic years in residence and must successfully complete a program of at least 80 credit units.

While specific course requirements vary from program to program, all candidates for a Master of Science degree are required to take Biostatistics 201a,b and Epidemiology 201a, unless they can demonstrate equivalent preparation. Candidates who do not have a background in medicine or biology are advised to take Environmental Science and Physiology 205a,b, or its equivalent, or a course in general biology elsewhere. Beyond these minimal course requirements, each program may specify additional courses that are necessary for satisfactory fulfillment of degree requirements in the particular area of specialization. These specific course requirements are generally *not* listed in this *Register*. The student should consult with his or her adviser or department or program head about these requirements before deciding which courses to take.

Combined Degree Programs

The admission and degree requirements for the Master of Science degree are the same as those listed for the Master of Public Health degree.

Doctor of Science

The Doctor of Science degree is an advanced graduate degree for those who intend to pursue academic or research careers in public health. The degree is granted on successful completion of a program of independent and original research in one of the basic disciplines of public health, and upon the presentation of this research in an acceptable thesis.

Requirements for Admission

Applicants for admission to candidacy for a Doctor of Science degree must satisfy the Committee on Admissions and Degrees and the department of specialization as to their overall qualifications for doctoral study and their ability to undertake original research in their chosen field. All candidates for a Doctor of Science degree must hold a baccalaureate degree. In some instances, an applicant will be expected to complete the Master of Science degree at the School before being granted admission to doctoral study. In such cases, the student will first be admitted to a Master of Science program. Scores for the Aptitude Test of the Graduate Record Examination must be submitted by all applicants to doctoral programs who do not hold earned doctoral degrees and should be no more than five years old. Applicants who hold an earned doctoral degree are urged to submit Aptitude Test scores from the GRE, or LSAT, MCAT or DAT tests, if available. Applicants to the Department of Health Policy and Management, however, *must* submit the GRE, except physicians or dentists, who may submit the MCAT or DAT.

Because specific prerequisites vary with the discipline or field of specialization, prospective applicants are urged to consult the program descriptions in this *Register* and the department or program to which admission is sought for more detailed information.

Requirements for the Degree

A minimum of two academic years of full-time study in residence at the University is required of students enrolled in the doctoral program. The required work and preparation of an acceptable thesis, however, ordinarily take longer. Residence requirements are fulfilled by payment of tuition (see page 98) and pursuit of an academic program approved by the department of concentration and the Committee on Admissions and Degrees.

The Committee on Admissions and Degrees is responsible for overseeing the programs of all doctoral students. During the registration period, each new doctoral student will receive a manual detailing the principles and procedures that are to be followed. A brief summary of requirements is given below.

Each doctoral student is required to take 40 to 60 credits in graduate-level courses distributed over a major and two minor fields. Each minor field will ordinarily consist of at least 10 credits in formal courses. Such requirements may be reduced in cases of prior relevant course work or experience. They may be increased in cases where there has been a substantial shift in field. Courses in the major and minor fields must be completed with distinction, with grades of "A" or "B." Unless equivalent preparation can be demonstrated, doctoral students must take Epidemiology 201a as well as courses in biostatistics through the intermediate level (ordinarily BIO 202c,d). Departments may stipulate specific course requirements and may require written and/or oral examinations on the course work in the three fields.

Qualifying Examination

By the end of the second year, the student should be prepared to take the oral qualifying examination. The main emphasis of this examination is to assess the student's potential to perform research in his/her chosen field. Since most doctoral research in the School requires a substantive knowledge of more than one discipline or field, the examining committee will include faculty from disciplines representing the minor fields as well as the major. The examination will include questioning in the major and minor fields outside of the proposed research.

A research committee consisting of the student's adviser and other faculty members is to be appointed within one month after the qualifying examination is passed. This committee has the responsibility for guiding the student's research through to completion. It will meet with the student at least once every six months to discuss details of the student's progress.

Thesis

An acceptable thesis must ordinarily be submitted within five years of the date of registration as a doctoral candidate. The thesis should consist of one or more manuscripts suitable for publication in a scientific medium appropriate to the candidate's field. Detailed requirements are available from the Registrar.

The thesis will not be accepted until a public presentation and discussion has been held, with the research committee in attendance.

Three bound copies of the approved thesis must be in the Registrar's Office before the faculty will vote the degree at their regular meetings in October, February or June.

Occasionally, thesis work will be performed *in nonresident* status. Before the doctoral subcommittee of the CAD grants such status, it is necessary that the research committee meet with the candidate to appraise the thesis plan. Agreement must be reached and the doctoral subcommittee must be advised in writing *before departure of the student* as to (1) acceptability and feasibility of the proposed thesis plan; (2) the timing and scope of the periodic written reports that will be required of the student; (3) arrangements that have been made or will be made for direct field supervision of the student; and (4) the minimum period of time the student will spend back at the School before the presentation and defense of the thesis. In no case will the doctoral subcommittee grant *in nonresident* status for more than one year at a time.

Students wishing further information on doctoral program requirements should refer to the *Guidelines for Doctoral Study* available in the Registrar's Office.

Residency for Board Certification

The School offers approved residency training leading to certification by the American Board of Preventive Medicine in Occupational Medicine.

For physicians who apply for and are accepted into an Occupational Medicine Residency, credit is given for one year of study leading to a public health degree. The residency also includes one year of supervised problem solving, research and clinical practice.

Additional information about the residency program may be obtained from Dr. Edward Baker, Associate Professor of Occupational Medicine.

Some financial support may be available through traineeships or National Research Service Awards for degree programs (U.S. citizenship or permanent residence status required). Further information on financial aid can be obtained from Dr. Baker, or from Ms. Margaret C. Salmon, Director of Financial Aid.

Postdoctoral Fellowship Program in Dental Public Health and Dental Care Administration

The School of Dental Medicine, in cooperation with the School of Public Health and the Massachusetts Department of Public Health, offers a program covering three academic years of postdoctoral study, intended to prepare a limited number of individuals for creative full-time teaching, research and/or administrative careers in dental public health and dental care organization. Each person accepted into the program will

be appointed as a Clinical or Research Fellow in Dental Care Administration at the School of Dental Medicine. The program is open to dentists and other qualified health professionals.

The program is in three parts of approximately one year each, which need not be completed in succession. One part of the program involves a formal course leading to a degree of Master of Public Health. The M.P.H. core courses must be completed in the first year at the School of Public Health and all requirements for the Master of Public Health degree in a maximum of two academic years. Candidates with an M.P.H. or equivalent from another school, however, may be accepted into the Postdoctoral Fellowship Program with one year advanced standing. The second portion involves a one-year supervised residency at the community, state or national level in health policy and administration. This residency meets the requirements of the American Board of Dental Public Health. The third portion affords opportunity for advanced didactic work and research at the School of Dental Medicine, the School of Public Health, other departments of the University, and/or other institutions. Epidemiological or health services research can be carried on over the entire three-year period in a variety of situations involving either new or continued studies. A research thesis is prepared for presentation at the end of the third year.

Fellows in Dental Care Administration who wish to become candidates for a degree in public health must meet the admission requirements of and be accepted into the School of Public Health. Application should be made directly to the School of Dental Medicine, whose Committee on Postdoctoral Education will forward the applicant's file to the School of Public Health for consideration.

Upon successful completion of this program, the candidate will receive the M.P.H. degree from the School of Public Health, as well as a Certificate of Postdoctoral Study in Dental Care Administration and a certificate of completion of residency requirements from the Harvard School of Dental Medicine.

Academic study beyond the master's level may be arranged with the School of Public Health and other departments of the University.

For further information and application forms, write to the Head, Committee on Postdoctoral Education, Harvard School of Dental Medicine, 188 Longwood Avenue, Boston, Massachusetts 02115.

Facing page, Dr. Steven Gortmaker, Associate Professor of Sociology, and Acting Chairman of the Department of Behavioral Sciences.

Departments and Programs

Department of Behavioral Sciences

Steven L. Gortmaker, A.B., S.M., Ph.D., Associate Professor of Sociology and Acting Chairman of the Department

Faculty Professor Pierce; Visiting Professor Mertens; Associate Professor McAuliffe; Assistant Professor D. Walker; Lecturer Wechsler

Teaching and Research Staff Visiting Lecturers Friedman and Levine; Lecturers Benfari and Hall; Instructors Daltroy and McArdle; Visiting Research Associate Bulhan

Introduction The Department of Behavioral Sciences seeks to train researchers, teachers and professionals in the knowledge and analytical skills of the behavioral sciences relevant to significant public health issues. The specific focal points for teaching and research are: (1) health promotion and education programs; (2) the influences of behavior on health and disease; (3) behavioral pathologies, including addiction to drugs and alcohol, mental illness and child abuse; (4) behavioral aspects of health services, including psycho-social factors affecting the utilization of services and compliance with medical regimens, as well as the behavior of health professionals; and (5) social science methodologies as applied to public health problems and the evaluation of health services and programs.

Degrees Master of Public Health with concentration in Behavioral Sciences; Master of Science in Behavioral Sciences; and Doctor of Science.

Research Current projects include research on opiate addiction among street addicts, recovering medical professionals and medical patients. The efficacy of self-help groups in preventing relapse in heroin addicts is being experimentally evaluated in Boston and Hong Kong. The study also seeks to learn the causes of relapse and how treatment programs may be improved.

A four-year evaluation of the Robert Wood Johnson Foundation's Rural Infant Care Program is examining the success of these programs in reducing infant morbidity and mortality.

Services used by youth and their families before, during and after runaways occur are being studied in five sites across the country.

An in-depth longitudinal study of developmental processes and "at-risk" health behaviors of school-aged pregnant women and adolescent parents is being conducted in the metropolitan Boston area. Research exploring the relationships among social supports, the availability and use of community services, family organizations, and the management and functioning of children with chronic illness is ongoing, using data collected from the Community Child Health Studies in three communities: Flint, Michigan; Cleveland, Ohio; and Berkshire County, Massachusetts.

The Harvard unit of the nation-wide Multiple Risk Factor Intervention Trial (MRFIT) has completed 10 years of research testing of the hypothesis that mortality from coronary heart disease can be reduced by altering the risk factors of elevated blood pressure, elevated blood choles-

terol and cigarette smoking. Published analyses show substantial reductions in all three risk factors.

Data collected from the Field Study of Youth Health Promotion Processes are being analyzed to determine how unhealthy life-styles are adopted and what intervention can prevent the onset of smoking, alcohol and drug abuse. Research was done in inner city and suburban schools in Boston and in two small towns in California, in collaboration with researchers at Stanford University.

Recent research has examined the area of health training and the role of stress and social support systems in the use of primary care health services.

Programs

Goals

Designed to train persons in the behavioral aspects of health and health services. Students learn research skills, techniques of applying behavioral sciences to public health issues and relevant elements of behavioral disciplines.

Curriculum

Master's candidates do course work in areas of health and behavior, health promotion/education, behavioral aspects of health services, and behavioral pathologies. Doctoral students are expected to develop expertise in three major areas of behavioral sciences, research methods and statistical computing, and an area of specialization such as the self-help approach to alcohol and drug treatment, smoking prevention and models of contraceptive behavior.

Admission

Applicants for the doctoral program must have a baccalaureate degree in a related behavioral sciences discipline. These individuals are admitted directly into the doctoral program.

Career Outlook

Recent graduates have taken research and teaching positions in major health institutions and academic settings.

Some of the courses the Department offers are described on page 118.

Department of Biostatistics

Marvin Zelen, S.B., A.M., Ph.D., Professor of Statistical Science and Chairman of the Department

Faculty

Professors and Visiting Professors Drolette, Iglewicz, Miettinen (on leave), Mosteller, Pagano, Wei, and Weinstein; Associate and Visiting Associate Professors Begg, H. Feldman, Feldstein, Gelber, D. Harrington, Lagakos, Laird, Lavin, Louis, Schoenfeld, Tsiatis, and Ware; Assistant and Visiting Assistant Professors Amato, J. J. Anderson, J. R. Anderson, Finkelstein, Gelman, Larson, Mehta, and Müller; Lecturer Bailar; Member of the Faculty Greenes; Emeritus Professor Reed

Teaching and Research Staff

Lecturers and Visiting Lecturers Anderson, James, Kent, McFadden, Smith, Waternaux, and Wyshak; Research Associate and Lecturer Awerbuch

Introduction

The Biostatistics program is designed to prepare students for careers which contribute to the theory and practice of statistical science as applied to the Health Sciences. Programs of study are offered in Applied Biomedical Computing, Biostatistics and Health Decision Sciences. Many unique opportunities exist to participate in methodological research and interdisciplinary collaborations.

Degrees

Master of Public Health with concentration in Biostatistics; Master of Science in Biostatistics; joint Master of Science with another department; Doctor of Science; and Doctor of Public Health.

Activities of the Department

The Department carries on a broad program of research activities in Biostatistical Science. During the 1983-84 academic year, there were working seminars meeting throughout the year on Risk Assessment, Carcinogenicity Experiments, Counting Processes, Longitudinal Studies, and Statistical Computing.

Current areas of emphasis include: *Environmental Health* — The Department engages in interdisciplinary research in health effects of air pollution, carcinogenesis testing and environmental monitoring. Recent studies have investigated cancer incidence near hazardous waste disposal sites, the carcinogenic effects of food dyes and the effects of particulate air pollution on respiratory health among children. *Computing* — Members of the Department are involved in research on statistical computing algorithms and data-base management. The School of Public Health has excellent computing facilities and supports all the commonly used statistical packages. Much of the Department's research on statistical software is carried out on the computing facilities at the Dana Farber Cancer Institute. *Medical Statistics and Clinical Trials* — The Department has a major commitment to collaborative clinical research in the treatment of cancer. The faculty includes leaders in the development of statistical and computing methods for clinical trials, including sequential methods, survival data analysis and data-base management. Members of the Department are involved in more than 100 national and international clinical trials currently in progress. *Health Policy and Decision Sciences* — The Department engages in research on quantitative problems in health policy and clinical decision making. Faculty members are investigating new methods for assessing risks and benefits

associated with environmental regulations; costs, risks and benefits of clinical practices and medical technologies; and the impact of organizational structure on decision making. The Department maintains a close relationship with the Institute for Health Research and the Department of Health Policy and Management. *World Health Organization* — The Department has been designated as a Biostatistics Evaluation Center by the World Health Organization. This activity is aimed at cancer control activities with special attention to the developing countries of the world. *Consulting* — The Department participates in a wide variety of medical research projects through the Biostatistics Consulting Laboratory. Students are expected to develop consultative and data analytic skills through participation in these consulting projects.

Programs

The One- and Two-Year Master's Programs in Biostatistics, leading to the S.M. degree, provide rigorous training and practical experience in statistical methods. One can also obtain an S.M., which is joint with another Department. Students enrolled in the School's M.P.H. Program may concentrate in Biostatistics.

Course work includes the mathematical basis of statistical inference; statistical methodology, epidemiology and computing; and a selection from courses in biomedical sciences and health policy and management. Besides course work, students are given experience in consulting and computing and the opportunity to teach in the Department's Schoolwide courses.

Candidates should have preparation in calculus and linear algebra. The one-year program is limited to students who already have a graduate degree in one of the mathematical sciences or who are otherwise unusually well prepared.

The Doctoral Program in Biostatistics, leading to a Doctor of Public Health or Doctor of Science degree, aims to develop the capability for research and scholarship, as well as providing a rigorous training in statistical practice.

Doctoral students may concentrate on either a Theoretical Track or an Applied Track. Course work includes the mathematical foundations of statistical inference, statistical methodology, epidemiology, and computing. Students on the Applied Track develop expertise in an allied field of public health. The students also gain experience in consulting, computing and teaching.

In the second year of course work, doctoral candidates are expected to take a comprehensive written examination and make an oral presentation of research plans. The doctoral thesis may include either original contributions to statistical methodology related to the health sciences or innovative application to a field of public health or medicine.

Students may enter the doctoral program through the master's program or can enter the doctoral program directly.

Dr. Marcello Pagano, Professor of Biostatistics.

Dr. Margaret Drolette, Professor of Biostatistics.

The Applied Biomedical Computing Program aims to acquaint students with both hardware and software and to train them in areas of application which are important in biomedical research. Besides the required courses in biostatistics and epidemiology, students in this program will take courses in computer operating systems, software engineering, data-base management, graphics, and laboratory science. They will also gain practical experience in biomedical computing in one of the Harvard-affiliated hospitals.

Both master's and doctoral degrees are offered in Biostatistics with special concentration in the Biomedical Computing Program. Admis-

sion, course work and dissertation requirements are as described above.

The Health Decision Science Program offers training in quantitative techniques in decision making at individual (clinical) and collective (policy) levels. In addition to core courses in probability and statistics, students take courses in decision analysis, cost-benefit and cost-effectiveness analysis, operations research, applied economics, behavioral decision theory, and computing. While methods are taught rigorously, applications to medicine, health care policy and environmental risk analysis are emphasized.

Candidates may apply either to the master's or doctoral degree programs in health decision sciences. The principal degree program is the doctoral program. The master's program is intended primarily for individuals with a medical background and adequate quantitative preparation, or for other individuals with limited quantitative background who expect to apply for admission to the doctoral program after one or two years.

Course Offerings

Courses offered by the Department cover a broad range with respect to mathematical sophistication and disciplinary focus.

Elementary courses assume little background in mathematics and are designed for a wide audience. They aim to develop facility in quantitative reasoning, a command of basic methodology and a critical appreciation of good statistical practice in the health sciences. BIO 201 is a School-wide requirement. (For students in Health Policy and Management, BIO 219 is substituted.) The other elementary courses are BIO 111, 112 and 113.

Intermediate courses are designed to develop methodological skills in specific areas of application, such as epidemiology, health policy and experimental science. At least one intermediate course is a School-wide requirement for doctoral students. The intermediate courses are BIO 202, 203, 204, 205, 207, 208, 211, 214, 216, 251, 273, 275, and 285.

Advanced courses require a background in mathematics and are primarily intended for degree candidates in Biostatistics. The advanced courses are BIO 209, 210, 217, 218, 220, 240, 261, 262, 263, and 274. Students may also take courses in the Department of Statistics and at the Massachusetts Institute of Technology.

Admission

See specific requirements on page 22 (S.M.) and page 24 (S.D.).

Career Outlook

The career outlook for biostatisticians is very promising. Biostatistics graduates have secured positions in government, universities, industry, and public health centers. Statisticians are needed in the broadly defined areas of medical care, drug therapy, health maintenance, environmental control, and health care administration. The 1978 report on professional employment needs, issued by the National Academy of Science, indicated a critical shortage of biostatisticians and epidemiologists with graduate degrees. This report also noted that shortages were likely to continue.

Some of the courses the Department offers are described on page 120.

Department of Cancer Biology

M. E. Essex, D.V.M., Ph.D., Professor of Microbiology and Chairman of the Department

Faculty Professors Cairns and Little; Associate Professors Eisenstadt, Greene, Haseltine, Kennedy, and Weichselbaum; Assistant Professors Glimcher, Mullins and Reynolds; Lecturer de Thé

Teaching and Research Staff Visiting Lecturers Cotter, Dressler, Fiumara, Grady, and Werner; Visiting Scientist Tachibana; Research Associates Billings, Chan, Henson, Lee, McGandy, Miller, Nagasawa, Romet-Lemonne, Schwartz, Umans, and Vetrovs

Introduction Research in the Department of Cancer Biology is primarily involved with cancer etiology. Training programs leading to the Doctor of Science degree are emphasized. The Department also participates in the professional degree programs offered by the School, for those interested. Doctoral training areas include basic and applied research in virology, immunology, cancer biology, and radiobiology. Please see individual laboratory listings for more specific research goals.

A collegial atmosphere prevails among the faculty and students. Students are encouraged to participate in the numerous seminar series and informal discussion groups the Harvard Medical Area has to offer. Course work is available in several areas of microbiology, in biochemistry and in cell biology at the Harvard Medical School, other schools within Harvard University or at the Massachusetts Institute of Technology, in addition to the offerings of the Department and the School.

The Department also maintains a relationship with the Massachusetts State Laboratory Institute, and is involved in joint research efforts with some of our associates at that Institute.

Degree Doctor of Science. (Please see degree requirements on page 24.)

Curriculum Course work during the first one to two years emphasizes cancer biology, cellular and molecular biology, virology, immunology, radiation biology, and genetics. It also develops the basic skills in laboratory techniques and data handling necessary for undertaking original research. The latter part of the program involves intensive laboratory research under the guidance of a faculty adviser.

Career Outlook Our recent graduates have accepted research and/or teaching positions with public and private academic institutions, with governmental agencies such as the National Institutes of Health and the Centers for Disease Control, and with private industry.

Publication Emphasis is placed on publication of research in the standard research literature. In most cases this is a departmental requirement, and most of our doctoral students publish several good papers before they complete the degree.

Laboratory of Carcinogenesis

This program offers doctoral-level training in the cellular and molecular effects of chemical carcinogenesis in preparation for research careers in cancer biology. Some areas of ongoing research in this area include study of the precise changes in DNA sequences produced by the main categories of chemical carcinogens and study of the general mechanisms of mutagenesis and DNA repair.

Information regarding the program in carcinogenesis may be obtained by writing Professor John Cairns, Director, Laboratory of Carcinogenesis, Department of Cancer Biology, 665 Huntington Avenue, Boston, MA 02115. A personal interview is strongly encouraged.

Laboratory of Radiobiology

This program offers doctoral-level training in the cellular and molecular effects of radiation in preparation for research careers in radiation biology and experimental carcinogenesis. Some areas of ongoing research in the program include the study of: the induction and mutations and malignant transformation in mammalian cells by low and high LET radiations and by chemical agents; radiation-induced DNA damage and repair processes at the cellular and molecular levels; cytogenetic effects of radiation and chemical pollutants; and the effects of radiation in human diploid cells from cancer-prone patients.

Information regarding the program in radiobiology may be obtained by writing Professor John B. Little, Director, Laboratory of Radiobiology, Department of Cancer Biology, 665 Huntington Avenue, Boston, MA 02115. A personal interview is strongly encouraged.

Laboratory of Virology, Immunology and Molecular Genetics

This program offers doctoral-level training in the immunology, molecular biology and epidemiology of infectious disease agents, especially viruses associated with cancer. Some areas of ongoing research in the program include the study of: the role of viruses in the cause of cancer, including hepatitis B virus and human liver cancer, and RNA tumor viruses as causes of leukemias, lymphomas, other tumors and immunosuppressive disorders of animals and man; tumor immunology; monoclonal antibodies; the molecular biology of cancer; gene regulation; and genetic events associated with the induction of leukemia and immunosuppressive disease.

Information regarding the program in virology, immunology and molecular genetics may be obtained by writing Professor M. Essex, Chairman, Department of Cancer Biology, 665 Huntington Avenue, Boston, MA 02115. A personal interview is strongly encouraged.

Some of the courses the Department offers are described on page 125.

Department of Environmental Science and Physiology

Joseph J. Harrington, B.C.E., A.M., Ph.D., Professor of Environmental Health Engineering in the Faculty of Public Health, and Gordon McKay Professor of Environmental Engineering in the Faculty of Arts and Sciences and Chairman of the Department

Faculty

Professors Brain, Ferris, First, Hornig, Mead, Moeller, Monson, and Spengler; Associate Professors Amdur, Baker, Burgess, Dennis, Drazen, H. A. Feldman, D. H. Leith (on leave), T. Smith, Speizer, and Valberg; Visiting Associate Professor Heyder; Assistant Professors Banzett, Boden, Butler, Ellenbecker, Evans, Greaves, Loring, and Robins; Lecturers Bjarngard, Cudworth, Judy, R. H. L. Murphy, Shapiro, Snook, and Webster; Members of the Faculty Ingram and D. E. Leith; Emeritus Professor Whittenberger

Teaching and Research Staff

Lecturers and Visiting Lecturers Arndt, Barmack, Bracken, Christiani, Corley, J. Douglass, Egan, R. Feldman, Forster, Gonzalez, Jaeger, Kern, Lakey, Landrigan, Levenstein, Levy, Mahoney, B. L. Murphy, Oliver, Pagnotto, J. Ryan, Selby, Storm, Varner, and Wegman; Instructor Goldman; Research Associates Beck, Davis, Dockery, Eisen, Hammond, Hoppin, Kimball, Letz, Parod, Reid, Rudnick, P. B. Ryan, J. Smith, Sweeney, and J. Wolfson; Visiting Scientist Demerjian; Visiting Research Associates Harbison and Yanagisawa

Introduction

With growing public awareness of the need for environmental pollution control and worker protection, increasing attention is being focused on these problems at all levels of our society. There are five specialized programs offered by the Department of Environmental Science and Physiology. The mechanisms of action and the adverse health effects of chemical and physical factors in occupational and community settings are typical problems that are central to the Department's interests. Such research provides the basis for prevention and control.

The problems are very complex and require the insights of many specialties. The faculty and staff of the Department reflect the multidisciplinary nature of the field and include applied mathematicians, chemists, economists, engineers, epidemiologists, physicians, physiologists, physicists, and specialists in occupational health. Students and research fellows come with similarly varied backgrounds.

Degrees

Master of Public Health with concentration in Environmental Health Sciences; Master of Science in Environmental Health Sciences; Master of Occupational Health; Master of Science in Physiology; Doctor of Science; and Doctor of Public Health.

Research

The research programs include topics such as: inhalation toxicology, comparative respiratory physiology, the deposition and clearance of particles in the respiratory tract, and epidemiologic studies of working populations and community populations exposed to various toxic materials; the mechanical properties of lungs and chest wall, development of pulmonary function tests and testing equipment, and application of these methods to the study of respiratory disease in occupational and community environments. Other research studies include: the evaluation of exposures to air contaminants of workers in the railroad industry, meat-handling establishments and silicon carbide pro-

duction facilities; development and application of personal samplers for determining individual and population doses to specific air contaminants, including those encountered indoors; development and application of engineering methods for collection of particles and pollutant gases from industrial gas streams; numerical analyses of urban scale atmospheric transport; determination of priorities for air pollution source control; evaluation of mechanisms for the adsorption of radioactive noble gases on activated carbon; analyses of failures of air cleaning systems in nuclear power plants; development of techniques for the control of naturally occurring radon and radon daughter products in homes; and evaluation of countermeasures for protecting the public in case of a nuclear accident.

Programs

Occupational Health

Information concerning programs and degrees in Occupational Medicine and Occupational Safety and Health may be found on page 68 under Educational Resource Center for Occupational Safety and Health.

Physical Sciences and Engineering

Air Pollution Control

Goals To provide education in the sciences basic to understanding air pollution research and control.

Curriculum Includes courses in community air pollution, health hazards of manufacturing processes, meteorological aspects of air pollution, identification and measurement of air contaminants, aerosol technology, and air and gas cleaning.

Admission Candidates for the program normally have a baccalaureate degree in engineering, chemistry, physics, or biology. Those with a master's degree in a discipline closely related to environmental health and those with a baccalaureate degree plus (1) two years of directly relevant experience, or (2) three or more years of experience related to their expected degree may be able to earn the S.M. degree in one year.

Career Outlook Recent graduates have taken positions with federal, state or local regulatory agencies and with consulting firms, industry or universities.

Industrial Hygiene

Goals The master's program is designed to meet the demand for professional personnel with the skills and scientific knowledge that are needed to identify and control health stresses associated with the working environment — e.g., air contamination, noise, radiation, heat, pressure, etc.

Curriculum Generally includes recommended and required courses dealing with basic problems in occupational health and industrial environments, policy issues in occupational health, environmental control, identification and measurement of air contaminants, air and gas cleaning, principles of toxicology, human factors in occupational performance and safety, and aerosol technology.

Admission Acceptable candidates for the program normally have a bachelor's degree in engineering, chemistry, physics, or biology. A course in organic chemistry is required. Although this is primarily a two-year program, students with master's degrees in the above disciplines and some students with prior training or experience in related areas may be able to earn the S.M. degree in one year. It is a terminal program for most students, although a few continue toward the Doctor of Science degree.

Career Outlook Recent graduates have taken positions with federal, state or local regulatory agencies and with consulting firms, industry or universities.

Environmental Health Management

Goals This program is intended for those with interests in quantitative approaches for the evaluation and management of the physical environment. The emphasis is on control of environmentally induced effects on human health.

Curriculum Students in the program are expected to complete courses in three areas: basic environmental sciences; data analysis and inference; and decision sciences. Courses in environmental sciences may have a wide scope or may be oriented toward a specific medium (e.g., air, surface water, groundwater) or pollutant (e.g., ionizing radiation). The environmental science courses may focus on monitoring, modeling or control of pollutants — or some mixture of these elements. Courses in data analysis and inference include basic biostatistics and epidemiology as well as more advanced topics such as multiple regression and analysis of variance. The required courses in decision sciences are intended to familiarize students with basic concepts and techniques from operations management, statistical decision analysis and economics. Courses in these three basic areas are supplemented by electives. Human physiology and introductory toxicology are strongly recommended. Other electives include: environmental law, environmental and natural resource policy, environmental or regulatory economics, computer science, cancer biology, environmental toxicology, and health risk assessment.

The core courses and many electives are offered at the School of Public Health. Students may supplement their programs with courses offered through other faculties at Harvard (e.g., the Division of Applied Sciences of the Graduate School of Arts and Sciences and the Kennedy School of Government). Appropriate courses may be taken at M.I.T. as well. Students particularly interested in hazardous waste management or groundwater contamination normally take about one-third of their courses outside the School of Public Health.

Admission Students admitted to the master's degree program normally hold a bachelor's degree in science or engineering. Other applicants are considered, but they must demonstrate preparation in calculus, physics and chemistry. The program is usually two years in length. Students are encouraged to participate in summer internships, although this is not a requirement. Candidates with more than two years of direct,

Dr. Donald Hornig, second from left, Alfred North Whitehead Professor of Chemistry in Public Health and Director of Interdisciplinary Programs in Health with Fellows Anthony Janetos and Shelley Weinstock. On far right is Rashid Shaikh, Director, Program on Environmental Health and Public Policy.

relevant experience may apply to the one-year program. Qualified students, holding appropriate undergraduate and/or graduate degrees, may be considered for admission to the doctoral program.

Career Outlook Recent graduates have taken technical and administrative positions with regulatory agencies, consulting firms and universities.

Radiological Health (Radiation Protection)

Goals To provide students with knowledge of the fundamentals of radiation protection. Considerable attention is given to the effects of environmental releases of radioactive materials, and the associated requirements for complying with regulations and standards.

Curriculum Includes recommended and required courses covering radiation protection, radiation biology, radiation instrumentation, radiation dosimetry, and aerosol technology.

Admission Students admitted to the program normally have bachelor's or master's degrees in physics, mathematics or engineering. Two years are normally required to earn the S.M. degree, although some students with prior training and/or experience in relevant areas may earn the degree in one year. About half the students continue toward the doctoral degree.

Career Outlook Recent graduates have taken positions with the nuclear power industry, hospitals, universities, research institutions, governmental regulatory agencies, and consulting architectural or engineering firms.

Respiratory Biology

Goals

This program offers doctoral training in preparation for research careers in respiratory biology. It is built on a public health viewpoint of the lung as a portal of entry and a target organ for environmental agents, and focuses on two aspects of organ system physiology: respiratory mechanics and respiratory defense mechanisms. Also emphasized are inhalation toxicology and the pathology of environmental and occupational lung disease. The biology is broadly based, ranging from molecular and cell biology to integrated organismic, environmental and comparative physiology; both normal and pathological physiology are included.

Curriculum

Intensive course work in the first two years may include physiology, biochemistry, histology, engineering, toxicology, radiation biology, statistics, epidemiology, pathology, and immunology. The latter part of the program consists of research under the guidance of a faculty adviser. Collaborative research opportunities exist in several area institutions. (See page 22 for specific degree requirements.)

Admission

Intended primarily for students with prior degrees in the physical sciences, or biology with a strong physical science and mathematical component. Two years of residence at the School are generally required to earn the S.M. degree; students with prior master's degrees in related areas may earn the S.M. degree in one year. Terminal master's degree programs are not ordinarily offered; students are expected to continue for the doctoral degree.

Career Outlook

Recent graduates and postdoctoral Fellows have taken positions in academic, clinical and government institutions engaging in basic and applied research and teaching in respiratory physiology and pathophysiology.

Respiratory Epidemiology

This program offers training at both the master's and doctoral level in preparation for research careers in respiratory epidemiology. Major work is directed toward assessing the possible effects of sulfur oxides and particulate matter on health. Other pollutants are also monitored. This has involved adults and children, and airborne material both indoors and outdoors. The research has been planned as a longitudinal study (about to enter its eleventh year), so that a considerable data base has been developed both for aerometrics and health data. Health effects are being assessed by standard questionnaires and simple tests of pulmonary function.

Interdisciplinary Programs in Health

Information concerning these programs and postdoctoral fellowships may be found on page 76.

Some of the courses the Department offers are described on page 127.

Department of Epidemiology

Brian MacMahon, M.B., Ch.B., D.P.H., Ph.D., S.M. in Hyg., M.D., M.D. (hon.), Henry Pickering Walcott Professor of Epidemiology and Chairman of the Department

Faculty Professors Hutchison, Miettinen (on leave) and Monson; Visiting Professor Trichopoulos; Associate Professors A. Walker (on leave) and Willett; Assistant Professor Gutensohn; Lecturer Klerman

Teaching and Research Staff Lecturers and Visiting Lecturers Boice, Cole, Cook, Ellison, Feinleib, Finkle, Jick, Li, Morrison, Paffenbarger, Sartwell, and Stanley; Research Associates Krolewski and Yen (on leave)

Introduction The major objective of the Department is to provide opportunities for training and experience in the application of epidemiologic research methods to the investigation of diseases of unknown etiology. Emphasis is on the cardiovascular disorders, the malignant neoplasms, abnormalities of reproduction and development, and other major diseases for which preventive measures are still unknown or inadequate.

Degrees Master of Science in Epidemiology; Doctor of Science; and Doctor of Public Health.

Research Research programs in the Department provide faculty members and graduate students the opportunity to work together exploring the following areas:

— the role of viruses in the etiology of cancer, particularly in relation to Hodgkin's disease
— the evaluation of different radiotherapy regimens for the treatment of Hodgkin's disease
— the relationship between thyroid disease treatment and breast cancer
— the relationship between exposure to chemicals in the workplace and the development of cancer
— the health effects of oral contraceptives
— the study of the relationship of hormonal patterns and breast cancer
— the role of diet in the development of kidney and bladder cancers
— etiology of non-Hodgkin's lymphoma, with emphasis on immune system disturbances
— the relationship of diet and risk of cancer
— factors in youth predisposing to chronic disease

Programs

Goals The master's program is intended to provide students with basic skills in epidemiologic and quantitative methods and in computing, in preparation for research careers. The doctoral programs are designed for persons who plan careers of research or teaching in epidemiology.

Curriculum The one-year research training program for the S.M. degree includes most of the courses offered by the Department, plus courses in principles of biostatistics, statistical methods in research and computing principles and methods (which are offered by the Department of Biostatistics). Additional formal courses in areas of special interest and/or

supervised research comprise the remainder of the program. The S.D. program is of four to five years' duration for persons holding baccalaureate degrees. For persons holding relevant doctoral degrees, however, the program is shorter, usually three years in length. Unless course work equivalent to that described above for the S.M. degree has been taken previously, most of the first two years of a doctoral program is occupied with courses. Subsequently, completion of a thesis and experience as a teaching assistant are the principal components. The content of the Dr.P.H. program is identical to that of the S.D. program and will vary in length, usually from two to five years, depending on the individual's background and progress with the thesis component. (Please see page 24 for more specific degree requirements.)

Admission

Ordinarily, candidates for the S.M. program are physicians, veterinarians and dentists. For qualified students, the period of research training may be extended by admission to either of the doctoral programs offered by the School, or by admission to special student status. Most of the training beyond the master's degree is occupied in supervised research experience. Potential doctoral candidates must plan at least two years in residence beyond completion of the master's degree.

The Department considers applications for direct admission to doctoral candidacy (S.D. degree) from persons holding baccalaureate degrees with strong backgrounds in biology and mathematics; it also encourages candidates holding other master's and doctoral degrees.

The Dr.P.H. program is available to persons holding the M.P.H. degree.

Career Outlook

Some of the positions recent graduates have taken: officer in Epidemiologic Intelligence Service, Centers for Disease Control; epidemiologists at the National Cancer Institute; and appointments at universities and medical schools in research and instruction.

Some of the courses the Department offers are described on page 133.

Dr. Nancy Gutensohn, Assistant Professor of Epidemiology.

Department of Health Policy and Management

Frederick Mosteller, S.B., S.M., A.M., Ph.D., S.D. (hon.), S.S.D. (hon.), Roger Irving Lee Professor of Mathematical Statistics and Chairman of the Department

Faculty

Professors Curran, Fineberg, Hiatt (on leave), Richmond, Roberts, and Rosenkrantz; Associate Professors Hsiao, Palmer, Shepard, Stason, Thompson (on leave), and Young; Assistant Professors Barrett, J.B. Brown, Kane, Mariner, and Thomas; Lecturers Barnes, Braun, J.L. Brown, P. Feldman, Hemenway, Henn, Kasten, Reich, Segall, Sheldon, Sherman, and Yacovone; Members of the Faculty Frazier, Hedley-Whyte and Herzlinger

Teaching and Research Staff

Lecturers and Visiting Lecturers Allen, Bander, Berarducci, Berwick, Bishoff, Bloem, Blumenthal, Bossert, Burchfield, Bycoff, Caplan, Cohen, Crampton, Cupples, DeFuria, C. Douglass, Dumbaugh, Field, Gougeon, Hatch, Hester, Hobart, Hoffman, Holden, Irish, Johnson, Komaroff, Koplan, Landy, Lee, Liang, Lorch, Marra, Montminy, Morris, Moseley, Munier, Nesson, Pass, Pyle, Rabkin, Reardon, Rosenberg, Rosenthal, Rozovsky, Sands, Shapiro, Sohl, Strange, Stranova, Taylor, Trevelyan, Wathne, J. Winsten, and M. Winsten; Instructor Marks; Research Associates Green and Saltman

Introduction

The Department of Health Policy and Management is concerned with the allocation and management of resources to deal with public health problems. Such problems may arise in the context of public policy decisions where choices must be made among various programs and policies. Activities must then be designed and implemented, whether the problem area is the health care delivery system, environmental or occupational health, etc. Alternatively, the problem may be set within an individual institution such as a hospital or community health center, or a public health agency where a manager must choose among competing programs and activities. Furthermore, in any setting, effective management is essential if objectives are to be achieved with the limited resources that are available.

The Department offers a two-year master's program in health policy and management, two one-year master's programs in health services administration and a doctoral program. The Department's faculty is interdisciplinary, including economists, political scientists, physicians, decision analysts, management specialists, and lawyers. Students in any of these programs may choose electives from courses offered at the School of Public Health, by other faculties within the University or at the Massachusetts Institute of Technology.

Degrees

Master of Science in Health Policy and Management; Master of Science in Health Services Administration; Master of Public Health with concentration in Health Services Administration; Doctor of Science; and Doctor of Public Health.

Programs

Master of Science in Health Policy and Management

The two-year program in Health Policy and Management is designed to provide a foundation of professional training for managers, policy analysts, planners, and others who intend to devote their careers to working on public health problems. The program has been designed

around four key elements: 1) a dual focus on policy and management; 2) an emphasis on both skills and concepts; 3) a grounding in the substance of public health problems; and 4) a curriculum combining academic and clinical activities.

The program is based on the premise that training in an academic setting must be complemented by experience in problem-solving situations. The curriculum is updated regularly and is applied to practical situations by means of a required summer internship program and an applied research program.

Dr. Stephen Thomas is Director of the Graduate Program in Health Policy and Management.

Curriculum

The curriculum for the Health Policy and Management program has been tailored to reinforce the above-described philosophy. There are four important and interrelated elements:

Required Core

A set of required core courses comprises the first year of each student's two-year program. These core courses provide the basic analytic skills and knowledge needed by professionals serving in both policy and management roles in the health field. Subjects covered include: quantitative methods, particularly epidemiology (EPI 201a) and biostatistics (HPM-BIO 219b, 219c, 219d); essential management skills (HPM 220a,b/220c,d); an introduction to policy analysis, including microeconomics (HPM 100a,b), decision analysis (HPM/BIO 280c), and political and bureaucratic analysis (HPM 250d); and substantive public health issues (HPM 240a). Students may be exempted from those core requirements in which they demonstrate prior proficiency.

Summer Internship

A required summer internship between the first and second years allows students to apply the skills and knowledge gained from the first year, and to acquire further understanding of career possibilities in the health care field.

Flexible Second-Year Curriculum

A flexible second-year curriculum is designed by each student in conjunction with his or her academic and clinical adviser. Maximum flexibility is provided in order to allow students to pursue their own particular areas of interest as fully as possible.

Typically, each student's second-year program of study concentrates on one of two primary skill areas (either policy or management) and in a single substantive health area (such as health services, nutrition, environment, international health, or population). Diverse course offerings allow students to develop expertise in their primary areas of concentration.

Applied Research Program

As part of their second-year activities, students are required to participate in an Applied Research Program. This program includes a research project carried out in conjunction with a local public health organization or agency.

Curriculum Tracks

In addition to the four basic elements described above, the program includes curriculum tracks for physicians and dentists, and for students interested in environmental health. These tracks combine the basic core disciplines of the program with courses directed toward students' specific interests. The Medical/Dental Track contains course work in Clinical Decision Analysis, Principles of Clinical Trials and others, and offers the option of receiving the M.P.H. degree concurrently (see pages 17, 47-48 for requirements). The Environmental Health Track contains course work in the Principles of Environmental Health and Environmental Health Policy Analysis. All other students automatically would be enrolled in the General Track, which contains course work in Health Care Delivery in the U.S., History and Sociology; and the Health Care Delivery System, Political and Economic Analysis. While remaining in the General Track, students primarily interested in international health may, with the consent of the Program Director, substitute internationally oriented courses for these two U.S. focused courses. Such courses might include Health Services in Developing Countries, Health Planning in Developing Countries and Program Implementation in Developing Countries. Applicants interested in a particular track should so note on their application.

Admission

The program seeks candidates whose academic record, personal characteristics and work experience suggest outstanding potential in the areas of health policy and management. Enrollment is limited to 50 or fewer students per year in order to allow for maximum interaction between students and faculty, both inside and outside the classroom. All applicants must demonstrate through course work and aptitude test performance the ability to master the quantitative and analytic content of the program. The program includes academically strong candidates from a wide variety of undergraduate fields. Normally, candidates have at least one year of pertinent post-baccalaureate work experience in the health field, but exceptions are sometimes made for particularly outstanding applicants. (Please see Degree Requirements for Admission, page 22, and Admissions, page 85.)

Deferred admissions are available for a limited number of applicants who demonstrate strong potential in the field, but who have not had work-related exposure to the health care system. Students who receive deferred admissions status are expected to work within the health system, in a position approved by the program, for a minimum of one year before matriculating. Applicants whose preparation appears deficient in some area, e.g., quantitative methods, may be offered provisional acceptance, contingent upon the successful completion of specific course work in advance of matriculation.

One of the goals of the School of Public Health is to address the health-related problems of the underserved, both in this country and abroad. Accordingly, the program is particularly interested in receiving applications from individuals whose special concerns extend to people in inner cities, rural areas, developing countries, and other locations where such problems exist.

Career Outlook

The program has developed an effective job placement mechanism for its students, utilizing academic and clinical faculty, program alumni and the resources of the School's counseling office. Additionally, a network of contacts has been developed with potential employers throughout the country and with professionals in a wide variety of executive-level positions who have attended the School's continuing education courses. Examples of positions secured by program graduates include: director of a community hospital; administrative director of a primary care center; director of a certificate of need program; analyst in a state regulatory agency; planner in HHS; director of a state commission on the handicapped; analyst in the Congressional Budget Office; and economist/planner with a health maintenance organization.

Master of Science in Health Services Administration

The one-year Master of Science in Health Services Administration program is designed to address the needs of individuals with advanced degrees in health or health-related fields, including law, who wish to specialize in health services in the areas of health policy, planning, regulation, and/or management. Students are required to concentrate their studies in either policy or management, while at the same time attaining a basic grounding in the general area of health policy and management. Curriculum options are also available for students interested in international health. In exceptional cases, applicants without a prior advanced degree, but with extensive, relevant policy and/or management experience (8-10 years) may be eligible for admission.

Dr. Herbert Sherman is the Director of the Master's Programs in Health Services Administration.

Curriculum

The curriculum for the Master of Science in Health Services Administration includes a required core for all students, departmental course work in a student's area of concentration chosen from offerings within the Department, and several electives either within or outside the Department. The curriculum totals 40 units or more during one academic year.

A total of 10.0 units comprises the required core:

EPI 201a Principles of Epidemiology (2.5 units)
HPM 240a Toward an Agenda for Public Health (2.5 units)
HPM 300c,d Applied Research Tutorial (5.0 units)

The Department offers four curriculum options, adding course work to the required core: *Policy Option:* add HPM/BIO 219b, 219c, 219d, HPM 221a,b, HPM 100a,b (or 205a,b), HPM 280c, and HPM 250d; *Management Option:* add HPM/BIO 219b, 219c, 219d, HPM 220a,b, 220c,d, HPM

205a,b (or 100a,b); *International Option:* add BIO 201a,b, HPM 205a,b (or 100a,b), HPM/POP 262c,d, HPM 266d; *Option for Lawyers:* add BIO 201a,b, HPM 221a,b, HPM 257b, HPM 254c, HPM 258d. (See M.P.H. with a concentration in Health Services Administration *Curriculum* for a discussion of the options.)

With the exception of the Applied Research Tutorial, students may be exempted from those requirements in which they demonstrate prior proficiency. The Tutorial consists of the preparation of a written report in the student's area of concentration, focusing on a topic of interest to both the student and a member of the Department's faculty. The report format may range from a case study to a research paper, and occasionally, depending on the student's interests, may include field work.

Admission

The program seeks candidates who hold graduate professional degrees and have some experience in health services.

Typical applicants to the program would be professionals in public health-related disciplines who expect to devote a substantial portion of time in their careers to health policy and/or management issues; and lawyers who are interested in health law, patient's rights and health planning and regulation.

The program is also designed to satisfy similar needs of health professionals who do not necessarily hold an advanced degree, but who have eight to 10 years' work experience in the health services area with a high degree of responsibility, and who wish to undertake course work in their areas of specialization.

All applicants must demonstrate through course work and aptitude test performance (GRE, MCAT, DAT, or LSAT) the ability to master the quantitative and analytic content of the program. Please see Admissions, page 81.

Master of Public Health with concentration in Health Services Administration

The one-year Master of Public Health is a School-wide program designed to prepare professionals for careers in public health practice. Through the core curriculum, the program provides a broad background in various disciplines basic to public health. By concentrating in Health Services Administration, a student commits him/herself to further study of issues in health policy, planning and/or management. Such students are provided with academic advisers chosen from Department faculty.

Dr. Herbert Sherman is Director of the Master's Programs in Health Services Administration.

Curriculum

Further information on the core curriculum for the School-wide M.P.H program is described on page 16 of this *Register*.

The Health Policy and Management Department offers four curriculum options designed to supplement the School-wide M.P.H. Program: Policy, Management, International, and Lawyers. In each instance, the option contains the required M.P.H. core or allowable substitutions,

along with some required HP&M courses. Applicants interested in one of these four options should so indicate on their applications, and in their statements of objectives should describe the nature of their interest in health policy and management. Applicants should also complete the "Statement of Responsibility" portion of the application.

To the School's M.P.H. requirements, the Department adds (or substitutes) the following: *Policy Option:* add HPM 240a, HPM 100a,b (or 205a,b), HPM/BIO 280c, HPM 250d; substitute HPM/BIO 219b, 219c, 219d for BIO 201a,b; *Management Option:* add HPM 240a, HPM 205a,b (or 100a,b); substitute HPM/BIO 219b, 219c, 219d for BIO 201a,b, and HPM 220a,b, 220c,d for HPM 221a,b; *International Option:* add HPM 240a, HPM 205a,b (or 100a,b), HPM 262c,d, HPM 266d; *Option for Lawyers:* add HPM 240a, HPM 257b, HPM 254c, HPM 258d.

The Policy Option includes course work on decision theory and benefit-cost analysis, and on the implementation of health policies and programs.

The Management Option substitutes the year-long Administrative Systems course for the one-semester Managing Health Delivery Institutions course, focusing on the development of concrete management skills, in addition to a broad overview of the field of management.

The options for lawyers and students interested in international health offer students a policy or management perspective while allowing the flexibility needed to design an appropriate academic program of study outside the Department.

Students choosing the International Option are expected to take course work on a variety of health issues related to their interests and experience in developing countries. Especially important will be the electives that stress the application of analytic techniques to program design, implementation and evaluation.

The Option for Lawyers adds a sequence of courses that reviews legal and professional methods of standard setting for medical care programs and loss control. Lawyers with other specialties (e.g., environmental health law) may substitute, with departmental approval, 7.5 units of other appropriate law and/or policy course work for HPM 254, 257 and 258.

Further information about these courses, rationales for substitutions and help in choosing between economics courses is available through the HP&M Programs office. Please note that the substitutions of HPM/BIO 219b, 219c, 219d and HPM 220a,b, 220c,d must be taken in their entirety.

Admission

Applicants must satisfy the requirements for admission to the M.P.H School-wide program as listed on page 16 of this *Register. All* applicants interested in a concentration in Health Services Administration must demonstrate through course work and aptitude test performance (GRE, MCAT, DAT, or LSAT) the ability to master the quantitative and analytic content of the program.

Dr. Stephen Thomas, Director of the Graduate Program in Health Policy and Management.

Doctor of Science/Doctor of Public Health

The doctoral program concentrates on preparing its graduates to perform research at the professional level. More than half the program graduates accept positions as faculty members in universities. Others join state or federal agencies or private research organizations. The degree of Doctor of Public Health is reserved for candidates with prior professional training.

Dr. Frederick Mosteller is Director of the doctoral programs.

Curriculum

Required courses cover health care processes and institutions, economics, statistical methods, management, and formal analytic methods. Students select both disciplinary and substantive area majors and minors. Disciplinary areas include economics, management sciences, political science, program evaluation and experimental design, decision sciences, and statistics. Substantive areas include disease prevention and health promotion, health care delivery, health resource allocation — capital and human — and technology assessment. A doctoral seminar is devoted to research methods. Doctoral dissertations comprising original research are advised by committees of three or more faculty members.

Admission

Preference is given to applicants with strong aptitude or competence in a quantitative discipline (demonstrated through course work, work experience and aptitude test performance on the GRE, though physicians or dentists may submit the MCAT or DAT), experience in the health sector, ability to organize and perform independent projects, and good interpersonal skills. Direct admission to the doctoral program is generally reserved for persons with relevant graduate education. Persons without such education may in exceptional circumstances be directly admitted, but will generally be referred to a master's program from which their doctoral application may be made.

Some of the courses the Department offers are described on page 135.

Dr. Mario Rodriguez, research Fellow in the Department of Tropical Public Health.

Dr. Ann Kennedy, Associate Professor of Radiobiology.

Dr. Rose Frisch, Lecturer on Population Studies.

Department of Maternal and Child Health

Isabelle Valadian, M.D., M.P.H., Professor of Maternal and Child Health and Chairman of the Department

Faculty Professor Curran; Visiting Professor Tanner; Assistant Professors Branch, Deykin, Gardner, Sachs, and D. Walker; Lecturers Crocker, Dwyer and Hayes; Emeritus Professor Reed

Teaching and Research Staff Lecturers and Visiting Lecturers Gold, Hollinshead, Newberger, Rauh, R. Ryan, and Stubblefield; Research Associates Butler and Harkness

Introduction The Department of Maternal and Child Health is concerned with the human life cycle, factors which affect individuals' life-long health status and the interventions and services needed to promote health.

Degrees Master of Public Health with concentration in Maternal and Child Health; Master of Science in Maternal and Child Health; Doctor of Science; and Doctor of Public Health.

Programs

Goals/ Curriculum The major objectives of the Department are to provide in-depth understanding of the physical, social and psychological determinants of health at various stages of the human life cycle and to promote application of this knowledge in health programs. Specifically, the curriculum emphasizes:

1. the developing individual and his or her changing physical, psychological, social, and cognitive strengths from conception to senescence within the context of family and community;
2. the examination of those health, welfare and related services which are currently available and those which could be instituted to meet the health needs of individuals, including those with chronic illness, handicapping or other special conditions;
3. the roles of governmental bodies, health agencies and voluntary and consumer groups in the organization and delivery of health and social services at all levels, e.g., international, national, state, and local;
4. the interface of law with health and related systems which has varied implications for service and research at different stages of life;
5. the skills of policy formulation, planning, management, and evaluation in MCH programs.

Research The research of the Department involves a broad range of interests. The Longitudinal Studies of Child Health and Development, started in 1930, have been expanded to investigate the patterns of growth, maturation and behavioral, social and nutritional changes in an aging cohort. These data have facilitated the study of variables influencing health status at various stages of life and related adult health to child health and development. Investigation of patterns of physical and behavioral development during childhood and adolescence have particular emphasis on the development of statistical methods for analyzing processes of growth and development, and the utilization of these methods in health program planning and evaluation.

The interface between health and social well-being is a major concern of the Department. Data from community-wide surveys on the availability and utilization of child health services in western Massachusetts and in an urban Michigan city have been collected and are being analyzed and disseminated. Another study evaluates an intervention program designed to reduce the occurrence of self-destructive or suicidal behavior among adolescents.

Doctoral students' research activities represent a range of interests in areas of health, development and service delivery. Recent doctoral studies have included topics such as motor development of children with Downs Syndrome, an intervention program for low-birthweight infants and obstetric risk assessment.

Research endeavors by Department faculty and students include a study of neurological and cognitive sequelae of early infancy apnea; an assessment of developmental intervention of high risk infants; studies on adolescent depression and suicide; a multidisciplinary, intergenerational study of school-aged pregnancy and parenting; and studies of family functioning in families with a child who has a chronic illness.

Admission

Professionals with advanced degrees from health disciplines (including medicine, dentistry, nursing, social work, nutrition, psychology, health education) and other related areas such as law, education and anthropology are eligible for the following degree programs:

The M.P.H. degree with concentration in MCH is a one-year program designed primarily for established health professionals who desire to broaden their knowledge of public health policy and strategies and their specific application to the area of maternal and child health. To be eligible for this degree, applicants must meet eligibility requirements specified by the general M.P.H. program, and in addition must have had relevant prior experience in maternal and child health.

Candidates admitted to the M.P.H. program in MCH must fulfill the core curriculum of the M.P.H. program described on page 17 and must take MCH 204a,b (5 credits) and a minimum of 10 credits selected from MCH formal courses for a total of 15 MCH course credits. It is expected that all students in this program will take courses leading to an understanding of normative physical and cognitive development, of maternal and child health services and of the legislation supporting health and social services in maternal and child health. Students who wish to be excused from specific courses covering this material may petition the Department, which will assess the student's proficiency in the area and may grant specific course waivers.

The Master of Science degree in Maternal and Child Health (S.M. in MCH) is designed for students who wish to focus in depth on maternal and child health. The Department offers both a one-year (40 credits) and a two-year (80 credits) program.

Applicants eligible for the one-year program are established practitioners or researchers with at least a prior master's degree in a related field

(medicine, nursing, social work, nutrition, physical therapy, education, or anthropology). Applicants who have a master's degree in a field unrelated to health (e.g., statistics, education, sociology) or who have a bachelor's degree in a health-related field and exceptional relevant work experience are eligible for consideration for the two-year master's program in MCH.

Candidates for the one-year master's program must fulfill at least 20 credit units in departmental offerings, whereas candidates for the two-year program must fulfill at least 30 credit units in departmental offerings, including the core courses. At the discretion of the Chairman of the Department, courses offered by other parts of the University may, on occasion, be substituted to fulfill this requirement.

Applicants to the doctoral program in the Department are required to have a prior advanced degree in a health field related to maternal and child health. Such applicants are judged on the basis of past academic performance, especially in the quantitative sciences, relevant experience, stated career goals, and interest in an area of research consonant with the goals of the Department.

Career Outlook

The master's degree prepares candidates for positions where they will be instrumental in initiating and reshaping public health practice at federal, state and local levels, assuming responsibility for advocating, formulating policies, and organizing and administering health care services for women, children, youth, and the aged. The doctoral program trains researchers and prepares professionals for academic positions.

A limited number of fellowships may be available to master's degree candidates who concentrate in the area of MCH and who are U.S. citizens.

Some of the courses the Department offers are described on page 142.

Department of Nutrition

Academic Committee

Robert P. Geyer, S.B., S.M., Ph.D., A.M. (hon.), Professor of Nutrition; Peter Goldman, B. Eng. Phys., A.M., M.D., Professor of Health Sciences in Nutrition; Mohamed S. el Lozy, M.B., B.Ch., M.D., Ph.D., Associate Professor of Nutrition

Faculty

Professors Antoniades and Lown; Associate Professor Verrier; Assistant Professors Franceschi and Owen; Lecturers Herrera-Acena, Reinhold and Witschi; Professors Emeriti Hegsted and Stare

Teaching and Research Staff

Visiting Lecturer Samonds; Lecturers Harkness, Hayes, Nicolosi, and Overholt; Visiting Research Associate Bartholow; Research Associates Ausman, Blatt, Chu, Graboys, Lampert, Lynch, Pantazis, Podrid, Raeder, Salata, Super, and Van Langenhove; Consultant McGandy; Assistant Gallagher

Introduction

The Department of Nutrition provides training and research opportunities in the basic science and the applied areas of nutrition, with orientation toward problems of contemporary public health importance. Other areas of nutrition concerning policy, planning and applied interventions have been a long-standing interest of the Department, as have health problems related to nutrition in this country and in Central and South America, Africa and Asia.

Degrees

Master of Public Health with concentration in Nutrition; Doctor of Science; joint Doctor of Science with Epidemiology; and Doctor of Public Health.

Research

The research of the Department involves various aspects of nutrition, ranging from cell biology and metabolism to animal pathophysiology, clinical studies and policy planning at domestic or international levels. At the molecular level are studies on the regulation of cell growth by hormonal growth factors obtained from both human blood components and cultured mammalian cells, as well as the synthesis and application of perfluorocarbons for blood replacement. Some specific studies are the mechanism of action of vitamin D, effects of diet on the metabolism of nutrients and drugs by gut flora, and the etiology of sudden death ischemic heart disease.

Extensive use is made of computers both in the mathematical modeling of growth and in interactive dietary analysis and counseling. Other areas of applied research include evaluation of nutrition programs and dietary methodology.

At the international level are projects concerning the effects of malnutrition on mortality, morbidity and mental and physical development. Research activities of the faculty are listed under the course number "NUT 351-368."

Programs

Goals

The Doctor of Science degree program in nutritional biochemistry is designed to train highly qualified individuals interested in laboratory-oriented approaches to solving nutrition and metabolic problems. By utilizing a number of scientific disciplines and engaging in appropriate

research, students learn and use the latest techniques in biochemistry, physiology and related fields. The research, whether basic or applied, is relevant to human health. The joint Doctor of Science degree in the Departments of Nutrition and Epidemiology furnishes thorough training in both of these disciplines, enabling graduates to apply sound epidemiological methods to an ever-increasing number of important nutritional problems. Applicants interested in earning the Doctor of Public Health degree in an area dealing with nutrition should contact the Department for information.

Curriculum

Students accepted to the S.D. program are required to take graduate courses in biochemistry, physiology, epidemiology, biostatistics, and the following Nutrition courses: Principles of Nutrition (NUT 201a,b), Departmental Seminars (NUT 204a,b/204c,d), Biochemistry and Physiology of Nutrition (NUT 205c,d), and Research Techniques in Nutritional Biochemistry (NUT 214a,b/214c,d). In addition, 5.0 units of other formal Nutrition courses are required for graduation. The course requirements for the doctoral program in Nutritional Biochemistry are the same as those given above, but the formal course work also must apply to one minor field in biochemistry and the other chosen from the other basic medical sciences. Research is begun during the first year, and a thesis must be completed within the period prescribed by the School (see page 24).

The joint S.D. degree with Epidemiology requires the student to take the courses designated for the Doctor of Science programs in the respective Departments. In addition to these courses, a minor field must also be selected that satisfies both Departments. A satisfactory thesis dealing with nutrition and epidemiology must be submitted within the time limit set by the School.

Students in the M.P.H. program who concentrate in Nutrition are required to take Principles of Nutrition (NUT 201a,b), Departmental Seminars (NUT 204a,b/204c,d) and at least one other course offered by the Department.

The requirements for the Dr.P.H. degree are the same as those given for the S.D. degree, but the candidate must hold an M.P.H. degree.

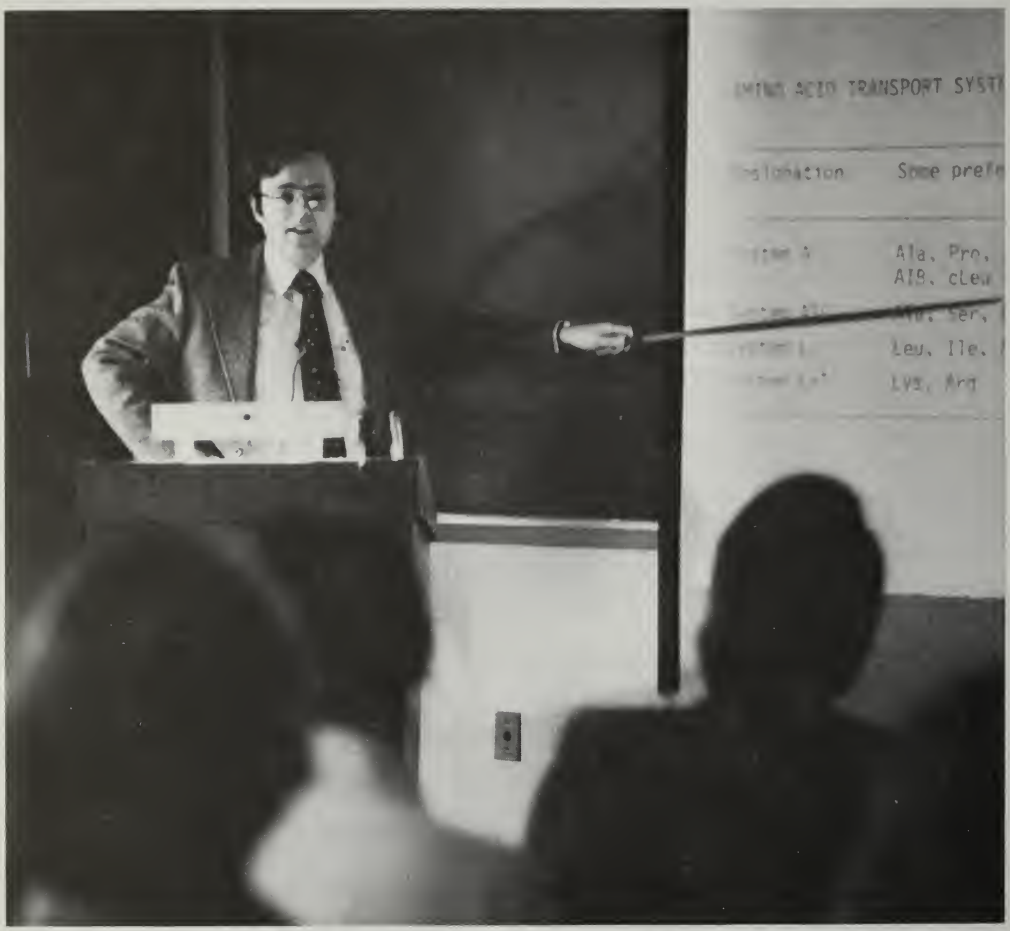
Admission

Students with a bachelor's or master's degree may apply for admission to the S.D. degree program in Nutritional Biochemistry. An excellent background in chemistry, biology, nutrition, or some other relevant science discipline is necessary for admission. Admission for the joint S.D. degree requires a strong background in biology and mathematics. Approval by both the Departments of Nutrition and Epidemiology is necessary. Applicants interested in this program should contact the Department of Nutrition before formally applying. Applicants for the Doctor of Public Health degree with emphasis in Nutrition should communicate with the Department prior to filing an application.

Career Outlook

Some positions recent graduates have taken: assistant professor of Biochemistry at a university; assistant professor and research associate at schools of medicine; postdoctoral research Fellows in medical centers and universities; nutrition research director at a major food company; nutritionist at a school of public health; director of nutrition support service in a medical center; community nutritionist for a state health project; local health clinic administrator; food analytical chemist for industrial firm; nutritionist for federal nutrition evaluation agency; and nutrition educator for a national Tunisian institute.

Some of the courses the Department offers are described on page 145.



Dr. Albert Owen, Assistant Professor of Biochemistry.

Department of Population Sciences

David E. Bell, A.B., A.M., LL.D. (hon.), Clarence James Gamble Professor of Population Sciences and International Health and Chairman of the Department

Faculty

Professors and Senior Lecturer Alonso, Dyck, J. Harrington, Levins, Nichols, Salhanick, and Wyon (on leave); Visiting Associate Professor Stark; Associate Professor Potter; Assistant Professor Larson; Lecturers Berggren, Frisch and Hareven; Member of the Faculty Lewontin

Teaching and Research Staff

Lecturers and Visiting Lecturers Chen, Guerrero, Harkness, Hausman, Lane, McIntosh, and Wray; Senior Research Associate Yerganian; Visiting Research Associate Makhoul; Research Associates Holtrop, Hunt, Lewontin, Puccia, Seeley, Whipple, and A. Wolfson; Consultants Gamble, Goldstein and C. Thomas

Introduction

Acting under the conviction that rapid population growth was thwarting efforts to provide better housing, education, nutrition, health services, and medical care, and that the disparity between rates of population increase and rates of development of human and economic resources is a crucial problem confronting society, the School of Public Health established the Department of Demography and Human Ecology in 1962 (renamed the Department of Population Sciences in 1969) and the Center for Population Studies in 1964. As the view of the role of population change in health and welfare has matured, increasing attention has been given to questions of the broader interrelations among population structure, health and welfare, and social change in both developing and industrialized countries.

Degrees

Master of Public Health with concentration in Population Sciences; Master of Science in Population Sciences; Doctor of Science; and Doctor of Public Health.

Research

Some research activities of the Department are: working toward a better understanding of the biochemical and endocrinologic mechanisms controlling fertility; studying the long-term impact of demographic changes within the United States; examining the interactions of fertility, income distribution and other aspects of socio-economic development; pursuing research applied to aspects of family planning and the interactions of fertility, nutrition and infectious diseases; continuing studies leading to community diagnoses of causes of rates of birth, death and migrations; studying biological aspects of population programs; studies of ethical aspects of population policies and programs; analyzing data collected in field studies in Haiti, including studies of mortality, morbidity, nutrition status, fertility, and impact of programs; examining factors that might improve food production; and mathematical and experimental study of human ecosystems.

Programs

Goals

There is wide variability among the programs of individual candidates, reflecting the diversity of the students' backgrounds, national origins, previous education, areas of professional concern, and career goals. Given these varied curriculum needs, the overall goals of the program are to develop sophistication in data and information management and evaluation, as well as to provide a broad philosophical perspective on problems and issues in the population field and on related issues of health and health care.

Curriculum

Faculty affiliated with the Department are specialists in demography, ethics, epidemiology, economics, sociology, ecology, genetics, and medicine. The formal courses and the tutorial instruction of the Department are planned to prepare students for effective participation in population programs as administrators, research workers or educators. Programs of study are offered in these areas: population, health and nutrition; the design, management and evaluation of population programs; the analysis of complex ecological systems; demographic analyses; and reproductive biomedicine. Although the Department offers a very flexible program, approximately half of the S.M. students are from or are primarily interested in health and population problems of developing countries. (Please refer to page 22 for specific degree requirements.)

For more information about the field visit to Haiti (see page 150), please address inquiries to the Department, *Field Studies*, 665 Huntington Avenue, Boston, MA 02115. Telephone (617) 732-1232.

Admission

Students with bachelor's degrees in biological and/or social sciences, or in other population-related fields, are generally expected to spend two years in residence toward the S.M. degree. Students with prior master's or higher degrees, or extensive work experience, generally complete study toward the S.M. degree in one year. Approximately one-fourth of those who complete the S.M. degree enter the doctoral program.

Career Outlook

Some positions recent graduates have taken: director of a university center for population studies; principal statistician; executive secretary of an international committee on applied research in population; president of a medical services consultants group; medical director of a planned parenthood association; director of a medical clinic; a program officer for U.N. Fund for Population Activities; a UNFPA coordinator; a population intern for USAID; and an associate program officer in Health and Nutrition for UNICEF.

Some of the courses the Department offers are described on page 148.

Laboratory of Toxicology

Armen H. Tashjian, Jr., M.D., Professor of Toxicology, Professor of Pharmacology and Director of the Laboratory (on leave 1984-85)

Faculty

Associate Professor Eisenstadt; Assistant Professors Rice, Samson, Schonbrunn and Toscano; Lecturer Ofner

Research and Teaching Staff

Visiting Lecturer Greenlee; Visiting Scientist Krug; Research Associate Voelkel

Introduction

Toxicology is the study of the injurious effects of chemicals. The scope of modern toxicology is broad and depends on the integration of knowledge and techniques from the medical, biological, chemical, and physical sciences. The faculty and staff of the Laboratory reflect the multidisciplinary aspects of toxicology.

Some of the areas in which the faculty of the Laboratory are conducting research include: receptor mediated toxicity, tumor promotion, site specific mutagenesis, biochemical regulation of cellular toxicity, DNA repair pathways, mechanisms of dioxin action and toxicity, and development and use of animal and human cell culture models.

The research and training program in Toxicology provides students with knowledge of the health implications of environmental chemicals, their interactions with a variety of cellular systems, biochemical mechanisms of cellular toxicity, the means to identify toxic environmental chemicals, and to prevent or reverse adverse effects where possible.

Students have the opportunity to broaden their research skills by rotating through at least three different laboratories for eight weeks each. The laboratory rotation experience is under the supervision of each laboratory head and enables the student to become familiar with a variety of laboratory research problems and techniques. At the end of each rotation, the student prepares a brief written report and gives an oral presentation. Students are encouraged to participate in weekly faculty-supervised journal clubs and laboratory research meetings. Students who are well into their thesis research are encouraged to present their research at appropriate regional and national scientific meetings.

Degrees

There are two doctoral programs offered: the Doctor of Science in the Faculty of Public Health and the Doctor of Philosophy in Pharmacology (Toxicology) undertaken jointly with the Department of Pharmacology through the Division of Medical Sciences at Harvard Medical School. The degree granted is determined by route of entry; however, the requirements and curriculum are identical.

Curriculum

The first year is usually devoted to course work. Courses are taken at the School of Public Health, within the Division of Medical Sciences, and at Harvard University in Cambridge. Appropriate courses also may be taken at M.I.T. Students are expected to pass a qualifying examination before the end of the third semester. Thesis research for the S.D. or Ph.D. degree should usually be completed in a total of four to five years in residence. The Ph.D. degree is granted by the Faculty of Arts and Sciences; the S.D. degree is granted by the Faculty of Public Health.

Carl Boland and Joan Joseph.

Admission

Students should have demonstrated knowledge of organic, physical and biological chemistry, general biology, physics, and calculus. There is no language requirement. A personal interview is strongly encouraged. The Graduate Record Examination is required.

Information regarding the program in Toxicology may be obtained by writing Professor Armen H. Tashjian, Jr., Director, Laboratory of Toxicology, Harvard School of Public Health, 665 Huntington Avenue, Boston, MA 02115.

Career Outlook

Upon receipt of the doctoral degree, it is expected that most students will take a period of postdoctoral fellowship training prior to entering a career in research in an academic institution, in government service or in industry.

Some of the courses the Laboratory offers are described on page 152.

Department of Tropical Public Health

John R. David, A.B., M.D., A.M. (hon.), John LaPorte Given Professor of Tropical Public Health and Chairman of the Department

Faculty Professors Chernin, Pan, Spielman, and Weller; Visiting Professor Gitler; Assistant Professors Hoff, Jungery and Wirth; Lecturers Boyer and Cash; Member of the Faculty Piessens

Teaching and Research Staff Lecturers and Visiting Lecturers Arias, W. Berggren, Buck, Dammin, Fendall, Foege, Hommel, Hopkins, Kaiser, Koch-Weser, Mata, Miller, Morrow, Moschella, Most, Mott, Neva, Nussenzweig, Pereira, Popenoe, Schrater, Scrimshaw, Sencer, von Lichtenberg, Weisfeld, and P. Weller; Instructor Maguire; Visiting Research Associate Pasvol; Research Associates Cicconi, Piesman, Rossignol, and Todd

Introduction Despite the changing nature of the health problems in the tropical areas of the world, infectious diseases remain of paramount importance. Within the Department of Tropical Public Health, research and teaching efforts center on the ecological and biological aspects of helminthic and protozoal diseases, and on the relevant arthropod and molluscan intermediate hosts. The basic course, Tropical Public Health 201a, is designed to provide students in the Master of Public Health program with knowledge regarding major parasitic diseases and to emphasize their epidemiology and control. Other courses deal selectively with various aspects of parasitism and emphasize the biology, immunology, molecular biology, vector biology, and pathology associated with the organisms. Although ecological, epidemiological, political, and social aspects relevant to the eradication and control of infectious agents are integrated into the teaching programs, the focus of the Department remains primarily on the biological aspects of the host-parasite relationship.

The resolution of the health problems of tropical areas requires a multidisciplinary approach involving a considered appraisal of human resources, as well as relevant social, economic and political factors. The student concentrating in the Department in preparation for a career in the field of international health should seek, in addition to departmental courses, broadened experience in other course work which deals specifically with these aspects of public health.

Degrees Master of Public Health with concentration in Tropical Public Health; Master of Science in Tropical Public Health; Doctor of Science; and Doctor of Public Health.

Research The investigative program in the Department currently deals with pathogens ranging from viruses to helminths. Studies on cell biology, immunology, molecular biology, and pathology of a wide variety of agents are in progress. Investigation of insect vectors comprise another area of major interest. Facilities are available for the training of a limited number of students at the Doctor of Public Health or Doctor of Science level. The doctoral degree applicant should, if possible, obtain the necessary medical science background prior to enrollment. Collaborative arrangements established with institutions in the tropics provide diversified opportunities for study and research overseas.

Tropical Public Health

Goals The program has the following goals: (1) to provide students who have adequate training in the health sciences with the additional background essential for careers in research or service in developing countries; (2) to introduce students to the significance, recognition and prevention of the major infectious disease problems of developing countries; and (3) to introduce them to aspects of human ecology and social development in such areas that influence public health.

Curriculum Students are required to fulfill the distribution requirements for an M.P.H. program (see page 17) and to take specific specialized courses offered by the Department; the nature of the specialized course work will depend on the interest of the candidate.

Admission The one-year M.P.H. degree program is designed for persons with prior medical degrees (M.D., D.V.M., D.M.D., D.D.S.) or doctoral degrees in biomedical science who are interested in problems of infectious disease in developing countries.

Career Outlook Graduates customarily direct programs dealing with the control of tropical diseases or with research on these entities. Posts are in the public or private sector and at the national and international level.

Medical and Public Health Parasitology

Goals The goals of the program are: (1) to acquaint the student with recent advances in the area of parasitic diseases and with the present status of such diseases throughout the world; (2) to develop skills for evaluation of the current literature and of control programs; and (3) to provide adequate background for conducting research on these diseases, including their biochemical and immunological aspects. The master's program is regarded as preparation for doctoral study.

Curriculum All students must satisfy basic course requirements in biostatistics, epidemiology and tropical public health. Students usually take advanced course work in one or more of those disciplines, and also elect courses in health services, environmental health sciences, microbiology, population sciences, etc., according to their interests. Students commonly cross-register for courses in the Harvard Medical School (e.g., immunology, pathology) and the Harvard Graduate School of Arts and Sciences. Appropriate courses also may be taken at M.I.T. Some of the elective work within the Department of Tropical Public Health may take the form of tutorials, laboratory research projects or both. (See page 22 for specific degree requirements.)

Admission Students with prior M.D. degrees or doctoral or master's degrees in biological or medical sciences are eligible for admission to this program. The exceptional candidate with a strong biological background but lacking a master's degree will be considered. For the student without prior preparation in pathology, biochemistry and immunology, two years of course work are customarily required before the S.M. degree is award-

ed; students with sufficient prior preparation may earn the master's degree in one year. The majority of students go on to earn the S.D. degree and enter careers in research and teaching in the area of medical parasitology.

Career Outlook Graduates are prepared to pursue academic or administrative careers that deal with the important parasitic diseases of man.

Ecology and Control of Vectors of Disease

Goals The specific educational goals of the program are: (1) to acquaint the student with the various arthropod and molluscan vectors of disease and to develop an appreciation of the biology of these organisms and the means for their control; (2) to prepare the student to plan and evaluate control programs; and (3) to develop skills with respect to identification, maintenance and experimental procedures involving these organisms.

Curriculum In addition to required courses in epidemiology and biostatistics, participants in the program will take courses in vector biology, entomology, malacology, parasitology, and microbiology. Depending upon the particular interests of each student, courses in cell biology, invertebrate physiology, pathology, genetics, population ecology, and computer sciences may be required. Each participant will conduct a program of original research. (See page 22 for specific degree requirements.)

Admission Students admitted to this program normally have prior medical degrees or doctorates or master's degrees in biological or medical sciences. Most students take two years to earn the S.M. degree, although some students with previous education in relevant areas may earn the degree in one year. Almost all recipients of the master's degree continue on for the doctorate, in preparation for careers in teaching and research.

Career Outlook The primary goal of this program is to train vector biologists for careers in teaching and research in universities and in governmental and international agencies. Graduates are expected to occupy key positions in programs directed toward investigating and controlling vector-borne disease. International health is emphasized. Thus, graduates of the program may engage in basic biological studies and in operational research.

Some of the courses the Department offers are described on page 153.

Facing page, Dr. Dade Moeller, Professor of Engineering in Environmental Health and Director of the Office of Continuing Education.

Centers, Offices and Special Programs

Center for Population Studies

The Center for Population Studies was established in 1964 under the leadership of the School of Public Health, as a University-wide Center to join scholars and scientists in different fields in a common approach to human population problems. The members and research associates of the Center are drawn from the Departments of Biology, Economics, Government, and Sociology; the Division of Applied Sciences; and the Schools of Public Health, Design, Divinity, Education, Government, and Medicine. The Center is located at 9 Bow Street, Cambridge.

In the School of Public Health, the Department of Population Sciences welcomes qualified candidates for the various degrees offered by the School. Courses open to all qualified students are also given by members of the Center in other parts of the University.

The present research programs of the Center and the Department focus on several themes: migration and development; laboratory and clinical research programs in human reproductive biology; economic, social, and environmental determinants and consequences of population change in America and other developed and developing countries, including public health aspects of fertility and the balance between populations and their resources; problems of urbanization and internal migration in both developed and developing countries; theories of population dynamics and their implications for public policy; political and ethical aspects of population policy; and the effect of nutrition and exercise on female reproduction.

The Director of the Center is David E. Bell, A.M., LL.D.

Center for the Prevention of Infectious Diseases

The Center for the Prevention of Infectious Diseases comprises the Departments of Tropical Public Health and Cancer Biology. Working in close collaboration, the staffs of the two Departments are concerned with the broad spectrum of agents that parasitize man, and with their relevant arthropod and molluscan vectors.

On a global basis, infectious diseases remain a primary cause of mortality. In the developed areas of the world, morbidity attributable to infectious diseases persists as a major impediment to the enjoyment of health. An increasing number of chronic degenerative diseases is recognized as stemming from the insults of prior infectious processes. In many societies, acceptance of the concept of population control awaits containment of undue mortality induced by infectious diseases and the consequent assurance that children who are born will have a reasonable prospect of achieving maturity. Considerations such as the foregoing emphasize the continuing need for the public health expert to possess knowledge of the rapidly changing technology of the control of infec-

tious diseases, as well as basic knowledge concerning the attributes and epidemiologic characteristics of the responsible agents.

The Faculty of the Center for the Prevention of Infectious Diseases works together to discharge a common responsibility for multidisciplinary instruction in the various facets of diseases of infectious etiology. The formal course offerings of the two Departments are designed and scheduled to permit the acquisition of a broad basic knowledge of infectious diseases, as well as an introduction to specialized subject areas. For qualified advanced students, concentration in specific areas with participation in collaborative or individual research is encouraged at both predoctoral and postdoctoral levels. The wide variety of current research projects in the Center permits acquisition of experience both at home and abroad, in the laboratory or in the field.

The Director of the Center is John R. David, M.D.

The Kresge Center for Environmental Health

This Center serves as a focal point for environmental health-related research and training activities within the School of Public Health. It includes programs within several departments, such as Cancer Biology, Environmental Science and Physiology and Epidemiology. Full-time faculty within the Center are physicians, engineers, physiologists, mathematicians, toxicologists, chemists, physicists, and other professionals. This diversity enables the staff to deal effectively with environmental and occupational health problems which require a multidisciplinary approach.

Specific categories in which the Center conducts research and training include:

1. Occupational health and safety
2. Air pollution health effects and control
3. Biochemical toxicology
4. Radiation biology
5. Radiological health (radiation protection)
6. Respiratory biology (inhalation toxicology)
7. Environmental health engineering
8. Environmental health management

Degree programs include the Master of Public Health, Master of Science, Master of Occupational Health, Doctor of Science, and Doctor of Public Health. Formal requirements for each of these degrees are outlined in other sections of the *Register*. Students interested in any of the above areas ordinarily enroll in the School of Public Health. Students whose primary interest is in problems of water quality and water resources generally enroll in the Division of Applied Sciences of the Graduate School of Arts and Sciences.

The Director of the Kresge Center is John B. Little, M.D.

Educational Resource Center for Occupational Safety & Health

The primary objective of the Educational Resource Center is to train professionals who will be involved in preventing occupational disease and injury. Employment opportunities exist in universities, governmental agencies, industry, and labor unions. Full-time academic programs are offered at the master's and doctoral levels. The multi-disciplinary training is supported by a grant from the National Institute of Occupational Safety and Health. Financial support is available to qualified individuals on a competitive basis. College-level inorganic and organic chemistry are required for entrance unless specific exception is made. Applicants presently holding positions in the fields of occupational safety and health who plan to return to those positions are considered particularly strong candidates for admission. For further information about any aspects of the educational programs listed below, contact Professor Richard R. Monson, Department of Environmental Science and Physiology, 665 Huntington Avenue, Boston, MA 02115. Formal requirements for the degrees are on pages 16-25.

Occupational Medicine

The residency in occupational medicine is comprised of training in the public health disciplines relevant to the prevention and control of occupational disease and injury. Upon completion of this residency program, physicians are eligible for certification by the American Board of Preventive Medicine (Occupational Medicine). The two-year program includes didactic sessions in epidemiology, biostatistics, occupational medicine, toxicology, industrial hygiene, and health policy, and the practical application of skills to problem solving and research. Field experience includes participation in health hazard evaluations; rotations through hospital-based occupational health clinics, the Massachusetts Poison Control Center, the Massachusetts Division of Occupational Hygiene and corporate medical departments; and the design, execution and analysis of data for a short-term research project. The residency leads to conferring of the Master of Occupational Health or Master of Public Health degree. Applicants should have completed one year of clinical training; certification by the American Board of Internal Medicine is recommended.

Industrial Hygiene and Occupational Safety

The two-year master's program in industrial hygiene and occupational safety is designed to help meet the demand for professional personnel with the skills and scientific knowledge needed to identify and control health problems that exist in the workplace. The core curriculum includes recommended and required courses dealing with basic problems in occupational health and industrial environments, environmental control, safety science, identification and measurement of air contaminants, air and gas cleaning, principles of toxicology, biomechanics and work physiology, and aerosol technology.

Students specializing in industrial hygiene normally undertake internships and research projects dealing with toxic substances, noise, radiation, and heat stress. Those specializing in occupational safety normally undertake internships and projects dealing with physical hazards or work methods that cause traumatic or cumulative injury. Students graduating with an emphasis in either area will obtain the skills required to handle the broad range of environmental hazards which exist in the workplace.

Candidates for the programs normally have a baccalaureate degree in engineering, chemistry, physics, or biology. Those with master's degrees in the above disciplines or prior training or experience in related areas may be able to earn the Master of Science degree in one year.

Occupational Safety and Health

Individuals with a baccalaureate degree and with advanced training in social or natural sciences may gain admission to a Master of Science degree program in occupational safety and health. The program can emphasize either the epidemiologic or policy aspects of occupational safety and health. This is generally a two-year degree program, although an individual with a Ph.D. or J.D. degree may complete the program in one year.

Occupational Health Nursing

A two-year educational program for the preparation of graduate nursing students in occupational health and occupational health nursing at the master's level is offered in collaboration with the Boston University School of Nursing. One academic year is spent at Harvard and one calendar year at Boston University. The program places major emphasis on promoting worker health and preventing disease through the development of occupational health assessment, intervention and evaluation skills. The training includes courses in occupational health, industrial hygiene, epidemiology, biostatistics, toxicology, occupational health nursing, health behavior, administration, and policy.

Applicants must have at least a baccalaureate degree in nursing from a National League for Nursing accredited program and three years of nursing experience. Upon completion of degree requirements, a Master of Science in Occupational Health Nursing degree will be awarded by Boston University and a Master of Science in Physiology (Occupational Health) degree will be granted by Harvard University.

Institute for Health Research

Efforts to promote equity of access or to improve the quality of health care have often had unexpected, and occasionally adverse, effects on the economy, legal institutions and even on the effectiveness and efficiency of medical care itself. These complex and poorly understood ramifications of choices in the field of health suggest that decisions ought no longer to be considered the province of any single discipline,

and that the study of many problems ought not to be left to the chance association of appropriate experts.

The Institute for Health Research was formed by the joining together, in July of 1983, of the Center for the Analysis of Health Practices of the School of Public Health and the Research Department of the Harvard Community Health Plan. The Institute's research agenda combines those of the antecedent organizations and includes interdisciplinary studies of: measures of efficacy, quality and cost-effectiveness of components of health care; factors influencing the decisions of providers and patients; resource flows in the health care system; and health policy.

The research output of the Institute appears in books, monographs, serial publications, and discussion papers.

Members of the Institute include some 30 investigators drawn from the Schools of Public Health and Medicine, whose disciplines include the medical specialties, psychology, biostatistics, economics, policy analysis, and engineering. While the Institute itself has no teaching responsibilities, its members maintain active departmental affiliations and teach in departmental programs. Appointment to membership in the Institute is the responsibility of its Executive Committee and is renewable annually. It is based on the individual's interest in, and willingness to collaborate actively in, the Institute's research activities, as well as on the relevance of the individual's professional skills to the Institute's research agenda.

The Institute receives its financial support from sources outside the University. The majority of its budget derives from research grants and contracts from governmental sources and private foundations. An important minority of its support comes as unrestricted funds from premium income of the Harvard Community Health Plan (HCHP) through the HCHP Foundation.

The Institute offers a variety of means for students to participate in its activities. Students whose dissertations concern issues in the health sector may wish to use the Institute as a resource during the development of their theses. Alternatively, a limited number of students may find opportunities to participate in Institute-sponsored research projects during the period of their enrollment in the University.

Students and faculty members who do not have a formal relationship to the Institute may remain aware of the research activities of its members by attending the weekly "brown bag" workshops, which serve as the major vehicle for communication among the members of the Institute and their collaborators.

Inquiries about the Institute should be directed to Drs. Howard Frazier, Donald Berwick, or Peter Braun, members of the Department of Health Policy and Management.

Office of Continuing Education

The Office of Continuing Education was established by the School of Public Health in January 1982. This Office is an outgrowth of the Executive Programs in Health Policy and Management and the Program of Continuing Education in Environmental Health. The purposes of the Office are: to stimulate continuing education activities throughout the School; to provide leadership in planning new programs; and to develop innovative approaches in this field. During the academic year 1984-85, the Office of Continuing Education will coordinate the presentation of approximately 30 courses, ranging from three days to two weeks in length, with the majority covering three to five days. Subject categories covered include Medical Sciences and Management, Occupational Health, Nuclear Safety and Radiation Protection, Environmental Management, and the Control of Indoor Environments.

Lectures in the courses are presented by regular faculty members of the School, supplemented by outside experts for the coverage of special topics. Selected courses incorporate the case method, while others include laboratory sessions during which participants can obtain practice in the use of the latest analytical apparatus and portable field measuring instruments. Each course offered under this program qualifies for one (1) Continuing Education Unit for every ten (10) hours of classroom participation. In addition, as an institution accredited by the Accreditation Council for Continuing Medical Education, the Harvard School of Public Health designates that certain courses meet the criteria for credit toward Category 1 of the Physician's Recognition Award of the American Medical Association. Selected courses have also been additionally reviewed and approved by appropriate environmental health-related certification boards.

Participants in the courses include physicians, health care personnel, scientists, and engineers. Most of the participants are employed by federal, state and local public health and regulatory agencies, industrial organizations, professional, trade and public interest organizations, legislative committees, research and development laboratories, public utilities, and consultant groups. During the 1983-84 academic year, over 900 professional personnel attended courses presented under this program. A partial listing of courses scheduled for presentation during the 1984-85 academic year is shown on page 115. Additional information can be obtained from the Office of Continuing Education, Harvard School of Public Health (Telephone: 617-732-1171). The Director of the Office is Dade W. Moeller, Ph.D.

Office of Health Policy Information

The Office of Health Policy Information is a resource center for journalists, government officials and others, and is designed to facilitate access to the University's wide-ranging resources in health policy analysis and research. It provides a mechanism for synthesizing and communicating available information in a manner that is timely and relevant to the needs of journalists, legislators, academic, corporate and labor leaders, and others involved in the consideration of health policy matters. The chief aim of the Office is to make a true public resource of the wealth of experience and information available within the University.

Current activities include the publication of a series of background reports analyzing health policy issues, a program of Ivan F. Boesky Visiting Fellowships for journalists and a monthly colloquium series, the Health Policy Forum. The reports are designed to keep key individuals abreast of important developments in health policy research and analysis. The fellowships provide distinguished medical and science reporters with the opportunity to spend six weeks in residence at the School while conducting intensive research. The Forum provides an opportunity for legislators, agency heads, health care providers, and corporate and labor leaders to discuss their views on health and science policy issues with an audience drawn from this state's academic, legal, political, consumer, health professional, and corporate and labor communities.

The Director is Jay A. Winsten, Ph.D.

Office of International Health Programs

The Office of International Health Programs provides advice both to foreign and to American students with interests in international health in the selection of appropriate programs and courses, and coordinates activities within the School that are relevant to international health. The School provides opportunities for preparation for teaching, research and service in international health, with particular emphasis on problems of health in developing countries. The School does not offer degrees in international health per se, but in the various public health disciplines, adapted to meet the needs of international health students. The central methodologies taught in the School—biostatistics, epidemiology, policy analysis, demographic analysis, management skills, and so on—are logically applicable to health problems in any human population. Teaching them to students from widely varying backgrounds, however, and teaching their application to countries with very different geographic, cultural and historical circumstances, has required many modifications in curriculum and in course content. Case studies and illustrative materials from less-developed countries, for example, are included in readings and class discussions in a number of courses. And some special courses are offered that focus primarily on less-developed countries, including courses on parasitic and infectious diseases, on nutrition and maternal and child health in developing countries, and

on health services, health planning and program implementation in developing countries.

The process of adapting the curriculum to the needs of students interested in international health is an ongoing one, and at any time there are inevitably some specialized demands that the School cannot meet. It is important, therefore, that students interested in international health consult with the Office of International Health Programs to be sure they are aware of all the alternatives available and plan the use of their time at Harvard to maximum advantage. In addition to the courses regularly available in the School, special tutorials can sometimes be arranged where the interests of students and faculty members coincide. Moreover, there are relevant courses available in other parts of Harvard University. Appropriate courses also may be taken at M.I.T. Cross-registration opportunities are available for students interested in medicine, economics, public administration, education, anthropology, government, social relations, and related subject areas appropriate to particular regions of the world. (Students may also cross-register for courses in foreign languages, but may not apply credit for such courses toward degrees being earned at the School.)

Faculty members active in international health programs have had experience in countries in Latin America and the Caribbean, Africa, Asia, and the Middle East. They are drawn from various departments and schools throughout the University, giving international health an interdepartmental and interdisciplinary orientation. Students at the School of Public Health come from more than 40 different countries.

The Director is Richard A. Cash, M.D., M.P.H.

The Associates Program

The Associates Program at the Harvard School of Public Health coordinates the exchange of ideas on current research and other topics of mutual interest between the School's faculty and colleagues in the private sector. Established in 1981 to foster creative academic-private sector links, the Program has made it possible for members to benefit from the resources of the School.

The program reflects the School's commitment to the concept that the health problems faced by society must be approached through a multidisciplinary framework if practical solutions are to be found. This strong multidisciplinary emphasis is embodied in the collaborative projects undertaken jointly by faculty and industry. It is exemplified, too, in the varied activities that the School sponsors for Associates Program members.

Members receive regular publications which describe faculty research and activities. Special symposia and research briefings, at which members discuss common problems together and with the faculty, are important program activities. In addition, faculty are also available for informal meetings with members.

The Community Health Improvement Program

The Community Health Improvement Program (CHIP) is a community service component of the Harvard School of Public Health which complements academic programs and courses at the institution. The objective of CHIP is to effect improvement in the health of communities by developing, implementing and evaluating innovative, community-based public health strategies in conjunction with community agencies.

Students accepted in the program receive 5 credits per term for a combination of community internships and participation in community health seminars. CHIP addresses four issue areas: 1) environmental and occupational health, 2) housing, 3) nutrition, and 4) primary care for low-income populations.

The service goals of CHIP are fulfilled by students and by CHIP staff who directly assist community agency personnel in problem-solving efforts aimed at improving the equity, efficiency and effectiveness of health service delivery, and improving the utility of policy-relevant information and evaluation techniques.

Finally, CHIP demonstration and research projects are guided by more general needs for new public health knowledge and understanding. These projects are developed by CHIP staff, faculty members associated with CHIP and by students.

J. Larry Brown, Ph.D., is the Executive Director and Principal Investigator.

The Graduate Program in the Division of Biological Sciences in Public Health

The Division

The goal of the Division of Biological Sciences in Public Health is to strengthen the application of biological knowledge and methodology to major issues of public health. As the first step, the Division seeks to attract able students for graduate study in the biological and biomedical sciences in order to bring to public health the most advanced ideas and techniques of the disciplines in which they have been trained.

The Division includes faculty members with research and teaching interests in the biological sciences from the Departments of Cancer Biology, Epidemiology, Environmental Science and Physiology (especially its Programs in Respiratory Biology and Occupational Health), Nutrition, Population Sciences, and Tropical Public Health, as well as the Laboratory of Toxicology.

The Graduate Program

The graduate program is designed to provide training for students who have not yet selected an area of concentration among the public health oriented biological sciences. After entering the School, students in the Division will take courses for one or two years in order to gain a thor-

ough grounding in the biological sciences as well as elements of the biomedical sciences and epidemiology. Students will also rotate for four- to eight-week periods through various laboratories and participate in Division-sponsored seminars. This will prepare them to make an informed choice of topic and supervisor before embarking on doctoral thesis research.

Admissions

General

Applicants to the Division should be committed to a career in the biological sciences related to public health, but need not have selected a specific area of research. Students in the Division will be supported financially. Admission will be to the Division as a whole as a candidate for a Doctor of Science degree. Applicants who have already chosen their field of study in a specific department may apply directly to their respective departments.

Requirements

Generally, applicants should have a bachelor's degree and demonstrated competence in organic chemistry, biological chemistry, general biology, general physics, and calculus. Applicants deficient in an area may be admitted provisionally, provided appropriate courses are taken before and/or after entry. The Graduate Record Examination (Verbal and Quantitative) is required.

Three letters of evaluation are required from instructors of science and mathematics. Evaluation letters from employers, for applicants who have worked in relevant areas, should also be supplied. Applicants desiring to visit the School are encouraged to come for an interview.

Additional information may be obtained from:

Admissions Office
Harvard School of Public Health
677 Huntington Avenue
Boston, MA 02115

Financial Aid

The Division will provide eligible students with two years of financial support (full tuition plus stipend). Thereafter, support will be assumed by the sponsoring department or laboratory in which the thesis work is conducted.

Graduate Instruction and the Curriculum

Entering students will be assigned to a Division faculty member who will serve as an adviser and who will assist the student in planning a course program.

The curriculum during the first two years is intended to provide the student with a strong background in the biological sciences as well as a familiarity with the areas of public health to which this knowledge may be applied. During this period students will be expected to obtain sufficient laboratory experience so that they can select a specific research project for a thesis topic that will ordinarily require three years to complete.

Course requirements, which will ordinarily be met within the first year and a half, are intended to be flexible so that students with diverse backgrounds and different emerging career goals may be accommodat-

ed. Thus, students, with the help of their advisers, may select a coherent program that might include courses in such disciplines as biochemistry, cell biology, pharmacology, virology, immunology, genetics, pathology, and human physiology.

The unique orientation of the program is expressed in three required courses:

1. A course in biostatistics, which, assuming some knowledge of probability and scientific inference, will provide competence in the major statistical methods required for both laboratory and epidemiological research.
2. A course that presents epidemiologic methods and a systematic analysis of the health status of populations both within the United States and in other parts of the world.
3. An interdisciplinary seminar which covers the evidence and the methods used to elucidate the biological basis for the amelioration of such health problems as arteriosclerosis, cancer, the effects of chemical and biological toxins, and infectious diseases.

Interdisciplinary Programs in Health

The primary objectives of Interdisciplinary Programs in Health (IPH) are to enlist scholars from the natural and social sciences in finding new ways to deal with the critical health problems of today's society and to attract and train for health fields young and midcareer people with strong backgrounds in a natural or social science.

IPH is designed to bring to health problems the knowledge, skills, insights, and analytic techniques of a variety of disciplines. It is a University-wide program, based at the School of Public Health. Members of the Faculties of Arts and Sciences, Business, Government, Law, and Medicine participate in IPH.

IPH presently focuses on environmental health, with particular emphasis on issues of both science and public policy related to chemicals in the environment.

Over 40,000 chemicals are currently in production and more than 500 additional ones are introduced each year, many of them biologically active. The problems raised by these chemicals provide the principal emphasis of IPH. The studies range from laboratory studies of biochemical effects at the cellular level to risk assessments and policy analyses of the regulatory process. Individual programs reflect the interests and wishes of participants.

Participants leave IPH prepared to work on health problems in federal, state and local governments, in industry and in research and, in some instances, to launch programs at other universities.

It is not a degree-granting program.

The Participants

IPH provides opportunities for:

1. Promising graduates of advanced degree programs in the natural or social sciences seeking preparation for careers in which their talents can be applied to environmental health-related problems, either through fundamental or applied research or through service.
2. Senior scientists and scholars who have made significant contributions in a discipline and now wish to apply their discipline to environmental health-related problems.
3. Individuals from government or industry who have been involved in problems of environmental health and regulation and wish to broaden their background and perspective.

In addition, IPH seeks to create new cooperative links among scholars within Harvard University as they work on problems relating their fields to applied health research.

The program has several components. First, research may be done individually, in collaboration with existing research groups or with new interdisciplinary teams. Second, seminars and working groups explore particular problems and develop papers and monographs. Third, Fellows and Visitors meet together regularly, joined by members of the Harvard faculty and distinguished guests, to exchange experiences and to discuss important issues related to health.

IPH Fellows

Postdoctoral fellowships are awarded for terms of one or two years, as appropriate, and may be renewable for a third year.

Fellows are chosen from the natural sciences (chemistry, biology, biochemistry, physics, and mathematics), the quantitative analytic areas (statistics, operations research, engineering, computer science, etc.) and the social sciences (economics, sociology, public policy, law, management, etc.).

Those selected will devote their initial period to orientation, exploration of opportunities and selection of projects and advisers. Experimental facilities will be made available in the laboratories of existing research groups. It is expected that during the term of a fellowship a substantial investigation or analysis will be completed.

For further information on admission requirements, contact:
Dr. Donald F. Hornig, Director.

Visiting Scientists and Scholars

Visitors may be on leave from universities, industry or public interest organizations. If stipends are required from IPH, they will be adjusted to individual circumstances and the availability of other support to the applicant. Applicants should submit a curriculum vitae, a list of publications, a proposal for research or study to be undertaken in IPH, and a statement of the relation of IPH to their career objectives.

Program in Human Ecology

The study of human ecology in a public health context is intended to integrate social, historical and ecological aspects of human existence in order to understand and influence the improvement of health in populations and communities. The Program emphasizes the inseparability of biological and social components of the patterns of health and disease, agriculture, environmental protection, and resource use within a framework of complex systems analysis.

Human Ecology is a new inter-departmental research and teaching program including faculty from the Department of Population Sciences and other areas. Students must be enrolled for a doctorate in one of the departments of HSPH and meet their department's requirements for the degree. In addition, they will usually take further training in quantitative and qualitative mathematical approaches to complex systems, general and human ecology and demography. Advanced courses are available as electives relevant to the student's own research interests. These might include agricultural systems and production, population ecology, ecological anthropology, specialized courses in tropical public health, environmental sciences, and biology.

Students interested in doctoral work in human ecology should apply for admission to one of the academic departments of the School indicating that interest and also write directly to Professor Richard Levins, Department of Population Sciences.

The Takemi Program in International Health

The Takemi Program in International Health at the Harvard School of Public Health offers a limited number of fellowships for research and advanced training on critical issues of international health, especially those related to developing countries. This interdisciplinary program, which was established in July 1983, focuses primarily on mobilizing, allocating and managing scarce resources to improve health, and on creating sound strategies for disease control and health promotion. To address these issues, it seeks to attract mid-career and young professionals from around the world with backgrounds in public health, medicine, economics, administration, biological science, and other fields. Through its fellowships for highly qualified individuals, the Takemi Program expects to contribute to institutional development and to improvement of national policy in the individual's home country as well as to the advancement of knowledge. The Program is named for Dr. Taro Takemi, the distinguished physician-scientist who served for more than 25 years as President of the Japan Medical Association.

The Takemi Program has four major objectives:

1. To create better methods for mobilizing and using health resources in both rich and poor countries.

2. To promote cooperative research and comparative analysis of health policies and programs in different countries.
3. To study transnational causes of ill health, such as population migration and disease transmission, and air and water pollution.
4. To bring together leading health professionals and scholars from many nations for research and training.

The primary goals of research under the Takemi Program are to investigate how resources are allocated and used for health purposes and to develop methods for making such choices more rational and equitable. Initially, the Program will focus its research on a few of the world's most urgent health needs, especially in the developing countries, and the most effective ways to meet them. A number of areas of research will be explored, including:

1. The assessment, choice and application of health technology.
2. The structure, organization and financing of health care.
3. The relationships among rapid population growth, increasing pressures on the environment and health status.

In all areas of research, the Program emphasizes the social and cultural factors that shape each country's efforts to improve health. The research activities of the Takemi Program are expected to have a strong practical emphasis. Fellows carry out their research projects at Harvard, using data they bring with them, but the projects are expected to be closely linked to action programs and to the Fellows' subsequent work after returning home. Program findings and results are disseminated widely and opportunities are sought to apply them in various settings.

Each Takemi Fellow is responsible for a specific research project and participates in the Program's weekly seminar. The Takemi seminar, the Fellowship Program's teaching activity, examines the question of how to set priorities under conditions of limited resources and evolving technology. The Takemi Program also sponsors one open seminar a month on important issues in international health, to explore possible research themes for the Program and to educate Harvard students and faculty on the state of knowledge and research in international health.

The Takemi Program is not degree oriented, as course requirements would substantially reduce a Fellow's time for research and writing. Upon completion of the Program, Takemi Fellows receive a Certificate and a record of their accomplishments as participants. Takemi Fellowships are generally awarded for 10 months. However, this may be adjusted in special cases.

The Acting Director of the Program is David E. Bell, A.M., LL.D., and the Executive Director is Michael R. Reich, Ph.D.

Public Health for Lawyers

With the dramatic expansion of legal and regulatory issues in health fields, the need for lawyers with formal training in the health sciences and disciplines is a critical one. There is a growing specialty field for lawyers in various applications of health law, including hospital and health care law, personal injury and compensation law, environmental health law, occupational health and safety law, child health law, etc. To meet the need, the School of Public Health has organized an interdisciplinary concentration in public health for legally trained students.

Various degree programs are open to applicants with a law degree and an aptitude for public health studies, as evidenced by undergraduate training which should have included courses in statistics, biology, psychology, health sciences, and other relevant areas. Most applicants will have been in law practice at least for a few years, preferably in health law areas. Some applicants are more recent law school graduates who show special promise for health law careers.

Lawyers may enter the General Program of the Master of Public Health degree program, or concentrate in particular departments of the School. For example, a special track of courses has been developed for lawyers in the Department of Health Policy and Management. Lawyers have also taken special concentration in Occupational Health, Environmental Health, Maternal and Child Health, and Population Sciences. Greater special concentration can be achieved by taking a Master of Science degree within a department or on a cross-departmental basis. To supplement their studies at the School, lawyer degree candidates may also avail themselves of course offerings at Harvard University's Schools of Law, Government and Medicine.

Inquiries may be addressed to Professor William J. Curran, 677 Huntington Avenue, Boston, MA 02115.

Facing page, John Sheffield, technical assistant in the Department of Cancer Biology, working on the FACS (Fluorescent Activated Cell Sorting) Analyzer.

General Information

History of the Harvard School of Public Health

Professional education in public health had been steadily expanding in Harvard University for more than two decades before the actual founding of the School in 1922. Its gradual development was characterized by certain important steps, the first of which was the establishment, in 1909, of the Department of Preventive Medicine and Hygiene in the Medical School — the first such department in the United States. The degree of Doctor of Public Health was first conferred in 1911. In that year, a Department of Sanitary Engineering was established in the Graduate School of Engineering. In 1913, the Department of Tropical Medicine, and in 1918, the Division of Industrial Hygiene with clinical and laboratory facilities were organized in the Harvard Medical School.

Also in 1913, the Harvard–Massachusetts Institute of Technology School for Health Officers was formed under the joint management of Harvard University and the Massachusetts Institute of Technology. This School operated until the fall of 1922, when it was superseded by the Harvard School of Public Health, made possible by an endowment for this purpose from the Rockefeller Foundation.

In the early years of the School's operation, several of its departments functioned as joint departments with counterparts in the Medical School, sharing facilities, faculty and budgets. In 1946, the School was separated administratively and financially from the Medical School and became an autonomous unit of Harvard University. It continues to cooperate with the Medical School in teaching and research, and has also developed close associations with other divisions of the University, particularly the Graduate School of Arts and Sciences, the John F. Kennedy School of Government and the Graduate School of Business Administration.

The School provides graduate education to prepare people for careers in the practice of public health and for academic and research careers in the public health sciences, as well as mid-career education. It offers the degrees of Master and Doctor of Public Health, Master and Doctor of Science and Master of Occupational Health.

Location and Resources

The main buildings of the School are the Health Sciences Laboratories at 665 Huntington Avenue, and the Sebastian S. Kresge Educational Facilities Building at 677 Huntington Avenue, Boston. These buildings are near the Harvard Medical and Dental Schools; the Countway Library of Medicine; the Children's Hospital Medical Center; the Beth Israel Hospital; the Brigham and Women's Hospital; and other Harvard-affiliated hospitals. The School's Center for Population Studies has an office in Cambridge.

Health Sciences Computing Facility

Computing and data processing resources are available to students through the Health Sciences Computing Facility (HSCF), which is operated by the School of Public Health. A staff of computer programmers and analysts assists researchers and students from all of the Harvard Medical Area institutions in using the computer as a tool for analyzing data, for doing extensive numerical calculations, for text formatting, and for acquiring, maintaining and processing large data bases.

HSCF is equipped with four computer systems, three of which are used interactively in a time-sharing mode and one which is used in a batch processing mode. Remote batch processing is accomplished by a high-speed telephone link to the ITEL AS/7031 computer at the Harvard Computing Center in Cambridge. Remote interactive computing is provided by telephone links to computers at the Dana-Farber Cancer Institute, the Harvard Computing Center, the Massachusetts Institute of Technology, and Dartmouth College.

HSCF offers computing capability for School programs using two VAX 11/780 computers running the UNIX operating system and a VAX 11/750 computer running the VMS operating system. Additionally, fifty DEC Professional 350 and IBM XT/PC personal computers are distributed throughout the School. Students may access the HSCF computers through teleprinter and video terminals as well as through the personal computers. Students also use an IBM 4341 system which features a number of statistical packages including SAS, SPSS, and BMDP. Languages available at HSCF include BASIC, Fortran 77, PL/1, MUMPS, Pascal, and C.

HSCF staff participate in several computing courses given by the Department of Biostatistics. In addition, HSCF offers short courses on specific languages, packages and specialized medical and health data bases. Students who have had computing experience may enroll in special tutorials (Biostatistics 313a,b,c,d). The Director of HSCF is Dr. Marcello Pagano.

Libraries

The library needs of the School are served principally by the Francis A. Countway Library of Medicine, located at 10 Shattuck Street. The Countway Library combines the resources and services of the Harvard Medical Library and the Boston Medical Library. Among libraries serving medical and health-related schools, it is the largest in the country, with recorded holdings of more than 509,000 volumes and 4,500 periodicals. The Countway Library also has extensive collections of historical materials, dating from the fifteenth century. Its History of Medicine Department provides modern facilities for the use of these books and other rarities.

All members of the University may borrow from the Harvard College library at Cambridge. Messenger service is provided daily between the college library, various other Harvard University libraries and the Countway Library. Some departments within the School also maintain their own libraries. The Boston Public Library, libraries of the Massachusetts Institute of Technology and other libraries of the Boston area add to the total book and periodical resources available to students.

Other Resources

Students at the School may enroll in courses in other faculties and departments of Harvard University, e.g., in the natural sciences, public administration, economics and other social sciences, statistics, and medical sciences. Many graduate courses at the Massachusetts Institute of Technology and the Fletcher School of Law and Diplomacy at Tufts University are also open to students at the School. Students will generally be granted credit for such courses toward degrees being earned at the School of Public Health, with the exception of courses in foreign languages. Credit granted for cross-registered courses may not exceed one-half of the credit units required for the degree in question.

The School maintains a close association with a wide variety of health, medical care and welfare organizations in Massachusetts and elsewhere. The facilities of hospitals and certain other institutions adjacent to the School are available to qualified students. Other local, national and international health facilities provide opportunities for observation and special studies, and members of their staffs are available to assist in the School's educational program. The State Laboratory Institute of the Massachusetts Department of Public Health offers opportunities for qualified students to obtain experience in laboratory methods pertinent to public health.

Taking a tour of Countway Library.

Application for Admission

Application forms for admission to all degree programs and for special student status can be obtained from the Admissions Office, Harvard School of Public Health, Room G-4, 677 Huntington Avenue, Boston, MA 02115 (telephone 617-732-1030). Applications for admission are generally accepted for the fall term only because of the sequencing of courses.

Applicants must submit the following for consideration by the Committee on Admissions and Degrees: (1) a completed application form; (2) transcripts of academic records at college, graduate schools and/or professional schools, with official certification of degrees conferred; and (3) letters of recommendation from at least three people who are well acquainted with the applicant's previous academic work and experience. In addition, the Graduate Record Examination must be taken within the last five years by certain applicants, as noted in the *Degree* section at the beginning of this *Register*. Applicants may apply to one degree program and one specialty area only. Please note that the applicant is responsible for assuring that the transcripts and letters of recommendation are submitted.

An application fee of $30, which is not refundable, must accompany the application in the form of a check drawn on a bank in the United States, a postal money order or an international money order payable to the Harvard School of Public Health.

In addition to fulfilling the specific requirements for admission to a degree program, applicants must satisfy the Committee on Admissions and Degrees as to their ability to undertake advanced study at a graduate level. The final decision as to the admissibility of an applicant rests with the Committee.

Admitted applicants submit a $100 tuition deposit when confirming admission. This deposit is credited to the fall term bill and is not refunded if the student fails to register.

The School is unable to accept all who are eligible for admission. Therefore, persons who wish to be considered for admission are urged to submit their completed applications (with references and transcripts) by February 1, but no later than March 1, prior to the academic year in which they wish to enroll.

Admission of a candidate is for a particular year; if enrollment at that time is not possible, re-application is necessary and will be considered on the same competitive basis as a new application. Exceptions to this must be approved by the Committee on Admissions and Degrees.

As a matter of policy, Harvard School of Public Health does not discriminate among applicants and students in admissions, educational policies, scholarship and loan programs, and athletic and other programs on the basis of race, religion, sex, national origin, color, creed, handicap, age, sexual orientation, marital or parental status, or status

as a Vietnam-era or disabled veteran. The School encourages women and members of minority groups to apply for admission. Increasing numbers of students with disabilities are enrolling at Harvard and are participating in a wide range of programs and activities. Every effort will be made to meet special needs. There are, however, no separate academic programs for either the physically handicapped or for students with learning disabilities; all enrolled students undertake the same program. The Assistant Dean for Student Affairs has been designated to assist handicapped students and employees in adapting to life at the School.

Foreign Students

Language Proficiency

Applicants from countries in which the language of instruction is not English must satisfy the Committee on Admissions and Degrees as to their ability to speak, read, write, and understand the English language competently. Only students who have shown evidence of academic excellence and who can understand rapid, idiomatic English and can speak, write and read English with a high degree of facility should apply for admission. Students should be advised that they may be required to attend 10 or more classes each week and to write papers and frequent short examinations. The School requires that all students maintain a minimum grade average of B− (grade point average 2.70) for graduation, and some departments and programs have more restrictive standards. No allowance is made for students whose English is not sufficient for these demands; therefore, any deficiency must be made up before admission. If a student completes all required course work but does not have a grade point average (GPA) of 2.70, the student will not be permitted to receive a degree.

The School requires that foreign applicants obtain a satisfactory score (ordinarily 550 or better) on the Test of English as a Foreign Language (TOEFL) and the TOEFL scores should be no more than two years old. The test is administered four times a year at centers throughout the world. Applicants are advised to take this test as early as possible in the admissions process. Information concerning the test may be obtained by writing to the Test of English as a Foreign Language, Box 899, Princeton, New Jersey 08540. *Applications will not be considered without documentation of English proficiency satisfactory to the School.*

Financial Certification

The School has adopted the following policy regarding foreign nationals who are applying for admission from outside the United States. An applicant whose financial support is not guaranteed by an official U.S. agency or foundation must submit evidence satisfactory to the School that he or she will have sufficient funds available in U.S. currency to pay the expenses for the full period of his or her academic program, and that he or she is permitted to exchange or export these funds. Certification of adequate financial resources must be received by the School before the immigration form needed to obtain a visa to enter the United States can be issued. Foreign students who are wholly supported

by personal funds will be required to have adequate funds to cover the cost of tuition in an escrow account in a U.S. bank before the immigration form will be issued.

Foreign nationals admitted to the School and already residing within the United States will also be required to submit satisfactory evidence of sufficient funds to cover their expenses for the full period of their academic program. Such students will not be permitted to register at the School unless they have adequate funds to cover the cost of tuition in an escrow account in a U.S. bank.

An estimate of living expenses in the Boston area may be found in the section entitled "Living Expenses" on page 103.

Academic Credentials

Before foreign students are permitted to register, the School must receive official sealed transcripts of all academic records presented for admission. Photocopies of original transcripts or diplomas are accepted only if properly notarized and placed in a sealed envelope by a notary public.

Employment

Foreign students admitted to study programs at the School of Public Health who hold M.D. degrees and who will be holding either an F-1 or J-1 visa under the sponsorship of Harvard University will not be permitted to accept any employment for which an M.D. degree is a prerequisite while in this country under the sponsorship of the University.

J-2 work permits are not automatically granted for spouses of students. Spouses should not expect to receive such a permit during the first six months or even a full year after they enter the country.

Hospital Insurance

All nonimmigrant foreign students are required to enroll in the Harvard Blue Cross/Blue Shield student insurance plan. There can be no exceptions to this requirement. More information about the plan is included in the section "Registration and Tuition."

All inquiries and communications regarding admission should be addressed to the Admissions Office at the address given on page 85.

Requirements for Non-degree Status

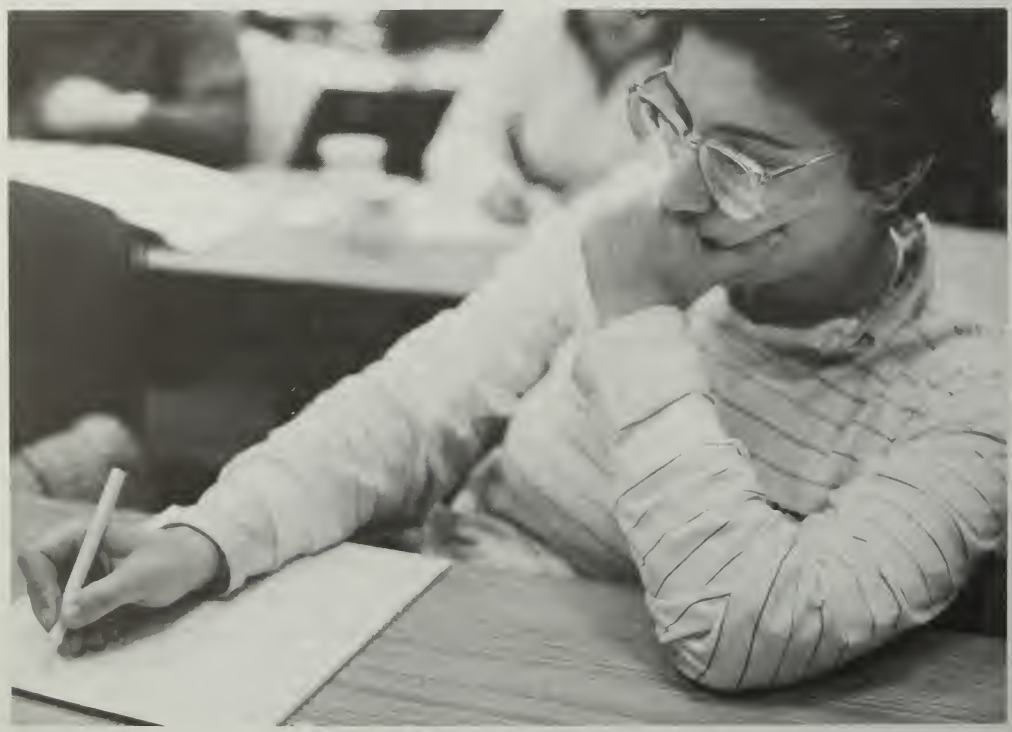
Courtesy Students

Persons holding Harvard Corporation appointments (of at least half-time teaching faculty) are permitted to enroll in courses at the School with the permission of the instructor and the Registrar. Harvard employees should consult the Personnel Office about the provisions of the Harvard Tuition Assistance Plan. Courtesy students may take a maximum of 5 credits per term. In courses with restricted enrollment, preference is given to degree candidates. Course fee payment is not refundable and must be paid at the time of or prior to registration.

Special Students

The School may accept a few students who are not degree candidates. Procedures and requirements for the admission of such students are the same as for degree candidates. Admission of special students to courses is subject to availability of space and the permission of the instructor. Candidates should specify on the application form the courses they plan to take. Admission as a special student carries with it no commitment to accept the applicant as a degree candidate and is limited to one academic year. Special students who wish to be admitted to degree candidacy must re-apply and will be considered on the same basis as other applicants for admission. Special students are not admitted only to audit courses. Special student status is governed by the same policies that apply to all matriculated students, but those enrolled less than full time are restricted to courses at HSPH. Students enrolled less than half time are charged tuition on a per credit basis. (See tuition and fees on page 98).

After admission to degree candidacy, students may petition the Committee on Admissions and Degrees to count toward academic requirements courses taken as a special student or courtesy student (i.e., while in nondegree status). Permission may be granted if the courses fit into the student's academic program. Students must still complete full credit units for the degree. Tuition credit is not given for these courses, and students who are granted such permission must still meet the tuition requirements for the degree. (See page 100 for tuition guidelines.)



General Information

The Academic Year

The academic year is divided into two terms. In the School of Public Health, the fall term begins in mid-September and the spring term begins in late January or early February. Each term is divided into two periods: "a" and "b" in the fall term, and "c" and "d" in the spring term. Between the terms, in January, a week of field work and special projects is called "e" period. There is a similar period during March recess called "f" period. The *Academic Calendar*, which gives term dates, recess periods, holidays, etc., is printed in the front of this *Register*.

Official Notices

It is important that each student keep informed of all official notices which are posted on the Office of the Registrar bulletin boards located on the G-Level of the Kresge Building.

Degree Candidates

Credit units are assigned on the basis of the total amount of time required by a course, both class time and outside preparation.

Full Time

Twenty credit units constitute a full program for one term, and a student must take a minimum of 40 credits for the year to be registered as full time. A full-time student must take a minimum of 15 credits per term and a minimum of 5 credits per period.

A full-time student may register for a maximum of 25 credit units per term, but no more than 50 credits per year unless permission to take more than this amount is obtained from the Committee on Admissions and Degrees (CAD). Any student seeking this permission must submit a CAD petition to the Registrar when s/he files a course form. Full-time students will not be charged additional tuition for any credits over 40 per year.

Students in the two-year, 80-credit Master of Science program must take a minimum of 40 credits in the first year and a minimum of 35 credits in the second year. Students who take additional credits in the first year may carry over only *five* (5) credits into the second year, i.e., the total 80-credit requirement may be met by taking 45 credits the first year and 35 the second year. Note that 60 credits must be taken ordinally.

Half Time

Ten credit units per term constitute a regular program for half-time students. Half-time students may register for a maximum of 12.5 and a minimum of 7.5 credit units per term for a total of 20 credits per year. Credit units over 20 per year will be assessed an additional tuition charge of $210 per credit unit on a per credit unit basis. Tuition paid for credits over 20 per year may not be applied toward total tuition requirements. Students wishing to take more than 25 credits per year must petition the CAD for approval, in addition to paying tuition for the extra credit units. A one-year program may be completed in two academic years.

Part Time

Students may register as part-time degree candidates with the approval of the Committee on Admissions and Degrees. Ordinarily this requires at least half-time attendance; however, full-time, full-tuition requirements for the degree must be met (see tuition and registration guidelines, page 100). A two-year, 80-credit unit program must be completed in three academic years. Tuition is charged at the rate of the first year at full time and the following two years at half time. Part-time degree candidates ordinarily take a total of 80 credit units in three years. Students in a two-year program desiring any other credit hour/program arrangements must submit an application to the CAD for approval.

Registration

Registration is held during the week prior to the Monday on which the fall term begins. Registration for *new* students in the spring term is held on the Monday on which the spring term begins. Continuing students will be required to register for spring courses in accordance with the deadlines given in the *Academic Calendar*. A fee of $25 per week will be charged for any late registration.

All foreign students who are registering at the School of Public Health must report to the Harvard International Office, Holyoke Center, 1350 Massachusetts Avenue, Cambridge, MA, at the beginning of each academic year or the beginning of the spring term if not registered for the preceding fall term. There they must present their passports and entry permits or other evidence of their immigration status. This requirement applies to all students who hold an F-1 student visa, a J-1 exchange visitor visa or permanent resident status.

Every student who is a degree candidate is expected to register until the requirements for the degree are fulfilled or until degree candidacy is terminated. Every resident student, whether full time or part time, must register in person at the beginning of each term. Doctoral candidates doing advanced work may petition the Committee on Admissions and Degrees to register with nonresident status. Since nonresident status is ordinarily considered less than half time, students in this category automatically fall into loan repayment and must make special arrangements for continuation of health insurance, as they are not eligible for the regular Harvard plans. Foreign students who wish to study as nonresidents but within the U.S. may petition for full-time status in order to maintain visa requirements.

To complete registration each student must file in person a course form prior to the start of classes (see *Calendar*). Registration is not considered complete or official until the course form has been accepted by the Registrar's Office. Course forms may not be submitted by persons other than the individual student unless the student has obtained special permission from the Registrar to accept such an arrangement. If students wish to take courses which are jointly offered at the School of Public Health and other Harvard faculties, they must register for these courses at the School of Public Health.

Courses may be dropped from the schedule at the discretion of the instructor if less than five students enroll.

Petition to Change Courses

All changes in courses, whether within the School of Public Health or by cross-registration, must be made by petition. Official forms, for dropping or adding courses or changing a grading option, are available in the Registrar's Office (see *Calendar* for deadline dates). After the official deadline, any drops/adds/changes in grading option require that the student submit a formal petition to the Committee on Admissions and Degrees. A charge of $25 is assessed for the processing of any petition which is approved by the Committee.

Cross-Registration

Students may take courses in other faculties of Harvard University. Appropriate courses also may be taken at M.I.T. and the Fletcher School of Law and Diplomacy at Tufts University. Students are advised that dates of deadlines for cross-registration (C-R) and for beginning of classes vary from school to school (MIT, the Business School and Law School begin fall classes at least one week earlier than the School of Public Health), sometimes making it difficult to coordinate registrations. It is important to consider the desirability of cross-registration in light of two factors. First, that some schools pattern the length and activity of their classes much differently than the School of Public Health. At the Business School, for example, classes meet intensively for several hours at a time instead of meeting in several one- or two-hour sessions per week. This may interfere with a student's ability to attend classes at HSPH. Second, commuting time to all but the Medical School may be as long as 45 minutes each way in winter, so that a total commitment of three hours may be required merely to attend a one-hour class. A student should discuss desirability and feasibility of cross-registration with his/her adviser.

Credit granted for cross-registered courses may not exceed one-half of the credit units required for the degree program of the student. Detailed instructions, credit conversions and cross-registration petitions are available at the Registrar's Office. Petitions must be filed early in each term, whether the course is being taken for credit or on an auditing basis. Students should check instruction sheets and the calendar for deadlines. (*Note*: Students should avoid visiting the Registrar's Office in another faculty on the day of that School's initial registration.) HSPH students who drop C-R courses should do so by filing standard drop/add forms in the HSPH Registrar's Office by the deadline published by the appropriate faculty. Drops will not be accepted after such deadlines.

Grades for C-R courses are transferred from other faculties according to their grading systems and not those of HSPH. Individual instructors may not determine grading options for cross-registered students but must conform to their faculty's official regulations. Students who cross-register are bound by the rules and regulations of the respective faculties regarding grades, examination schedules, make-up examinations, and

incomplete work. These regulations are often very different from those at HSPH, and students with questions should consult with the Registrar of the faculty involved. Degree candidates are urged to check the examination schedules of cross-registered courses to avoid possible problems of late reporting of grades to HSPH faculty for the degree lists. Some schools give examinations at so late a date that grade returns are not possible for HSPH degree candidates.

Undergraduate-level courses taken by cross-registration may not be counted toward a degree at HSPH. Credit will not be granted for undergraduate-level courses. Part-time special students at HSPH may not cross-register.

Tutorials

All tutorials receiving degree credit at HSPH must be taken under the supervision of an HSPH faculty member. Any student seeking exception to this ruling must petition the Committee on Admissions and Degrees for approval. Students must obtain permission from their advisers and file tutorial forms giving descriptions of the course content, hours required and credit to be awarded when they file course forms. Students are expected to complete a minimum of two hours of work per week throughout the term to receive 1 unit of credit. All tutorials are given on a pass/fail basis. Ordinal grading is not permitted for tutorials.

Audited Courses

Courses may be audited at the discretion of an instructor. No credit is given and no audited courses appear on permanent records or transcripts. Some HSPH courses exclude auditors.

Radcliffe Seminars and Harvard Extension School Courses will not receive degree credit at HSPH.

Withdrawal and Leave of Absence

Students wishing to *withdraw* must notify the Registrar and their department in writing and schedule an exit interview with the Director of Financial Aid and the International Students' Office where appropriate.

Students wishing to take a *leave of absence* must file a petition using a form available in the Registrar's Office which must be signed by the adviser and department chairman. The Committee on Admissions and Degrees ordinarily grants leaves of absence for a maximum of two terms.

Students planning to petition for a leave of absence or to withdraw should make an appointment with the Assistant Dean for Student Affairs.

Tuition is prorated according to the calendar dates published on page 100. The effective date of a withdrawal will be the date the letter of withdrawal is filed with the Registrar, or a future date if so requested in the letter by the student. For students granted a leave of absence, tuition is charged to the end of the tuition period in which the student is granted the leave of absence. The deadlines for leaves and withdrawals from the School without becoming liable for payment of tuition are given in the *Academic Calendar*. A student who fails to register by the last day to register in a term will be automatically withdrawn unless a

leave of absence has been approved. Students who withdraw must apply for re-admission. Students who withdraw after the last meeting of a class will be considered registered for the entire course and the grade will be recorded. Blue Cross-Blue Shield health payments may not be prorated but must be paid by the term.

Notification of Grades

Grade reports for the fall term are available in the Registrar's Office at the end of February. Spring grade reports are mailed to permanent addresses at the end of June. No grades are given to students either by telephone or in person until all grade reports are prepared. Students who wish to know their grades immediately after a course ends may leave a stamped, self-addressed postcard with their instructor or hand it in with the bluebook in courses giving final examinations. Students should confirm this arrangement with the instructor.

Transcripts

Official transcripts may be ordered by filling out a form in the Registrar's Office. The first copy is free, subsequent copies are $1 each. Students should allow three to five working days for processing transcript orders. Transcripts given directly to students are stamped "Issued to Student," and anyone requesting records should check to be sure other institutions accept transcripts sent by someone other than the Registrar.

If a student leaves the School with outstanding financial obligations to the University, transcripts are sent directly to the student and not to third parties. Such transcripts carry notations "Issued to Student" and "Student's Financial Obligations to the University Have Not Been Met."

Transcripts which students submitted to the School of Public Health as part of the admission process to the School remain part of the student's permanent record. These transcripts are never sent to third parties. Students must obtain copies of these transcripts from the school where the academic credit was earned and the degree awarded.

Student Addresses

All students must give their local address at registration and must keep the Registrar's Office informed of any changes in their local address.

ID Cards

Students are issued official Harvard University identification cards for use throughout the Harvard community to gain access to libraries and classroom buildings. Since these cards are often used as general identification for cashing checks, it is essential to take precautions against loss. Replacements may be ordered through application at the Registrar's Office, where temporary IDs are issued. A replacement fee of $10 is charged to a student's term bill. These cards must be returned to the Registrar's Office upon termination of student status.

Summer Study

HSPH has no regular summer course program, but some students elect to do tutorial or research work during the summer recess. A maximum of 5 credits will be given for degree credit in summer study. Students must file summer registration forms with the Registrar's Office before the end of May in order to receive degree credit for summer work. Tuition for summer courses may not be applied toward tuition requirements for the degree.

Harvard and MIT Summer Schools

Students should consult departmental advisers before enrolling. Departmental approval is required for degree credit and the Committee on Admissions and Degrees considers petitions for degree credit only after final grades are received in the Registrar's Office. Students must request transcripts and file petitions by published deadlines.

All other summer work must have prior approval of both department and the CAD for consideration for degree credit. The deadline for such petitions is May 25. Degree credit is not ordinarily granted for work done at universities other than Harvard and MIT.

The Grading System

The grading system is as follows: Courses on the 100- and 200-level may be taken with ordinal or pass/fail grades. The ordinal system used for 100 and 200 level courses is A,B,C, and F. The grades have the following numerical values: A = 4.0 (Excellent), A− = 3.7, B+ = 3.3 (Good), B = 3.0, B− = 2.70 (Satisfactory), C+ = 2.3, C = 2.0 (Poor), C− = 1.7, F = 0 (Failing). Courses at the 300 level may be taken only pass/fail.

Minimal grade point average requirements and distributional requirements have been instituted for all students entering degree programs in the fall semester of 1979 and thereafter. Semester and cumulative grade point averages will be computed on courses taken on an A,B,C,F basis anywhere at Harvard and M.I.T. Courses taken pass/fail or on grading systems other than A,B,C,F will not be calculated in the grade point average. The minimal standard for satisfactory work will be 2.70; students must have that average or above to qualify for a degree. Individual departments and programs may set more restrictive standards.

Students taking a one-year degree program are required to take a minimum of 30 credits on the A,B,C,F basis and the remainder as the student elects. Students taking degree programs lasting two or more years are required to take a minimum of 60 credits on the A,B,C,F basis and the remainder as the student elects. This requirement will be verified by the Registrar prior to the awarding of any degree. Doctoral students must receive grades of either A or B in courses counted for their major or minor fields.

Exceptions to this policy can be sought by students or faculty by petition to the Committee on Admissions and Degrees. Cross-registered courses taken elsewhere at Harvard can be included in the minimums if they are at the 100 level or above and if taken with an A,B,C,F grading system.

Faculty are encouraged to offer both grading options (ordinal or pass/fail) in all 100- or 200-level courses. However, faculty who wish to offer only the ordinal grading system may do so but must publish this information in advance of the beginning of the course.

Courses may not be limited to pass/fail only, as students have the right to receive grades on the A, B, C, F (ordinal) system if they so designate at the time of course registration or subsequently by petition.

When courses are taken on a pass/fail basis, grades A through C− are equated with a Pass. A grade of F has the same value (0 credit) in either the ordinal or the pass/fail system. Grades received in courses taken on a pass/fail basis are not included when computing the student's grade point average.

Students may normally repeat failed courses for both grade and credit. The grade received when the course was taken the first time remains a permanent part of the record, but only the repeated grade will be used in computing the cumulative grade point average. (See section on *Failure of Required Courses*.)

A grade of incomplete (I) may be awarded at the discretion of the instructor. Incompletes remain a part of the student's permanent record. Once a grade is received, it is added next to the Incomplete, e.g., I/B. An incomplete will be recorded as a failure on a student's permanent record unless the deficiency has been corrected by the end of the next term, on the deadline noted in the *Academic Calendar*. An instructor may require that the student correct the deficiency earlier, in which case the student and the Registrar should be informed in writing of the deadline. Students receiving an incomplete for a course required for graduation will not be awarded a degree until the course work is satisfactorily completed and a passing grade submitted to the Registrar's Office in writing.

Failure of Required Courses

BIO 201a,b (or HPM 219b,c,d) and EPI 201a are courses that are required for all Harvard School of Public Health students. Each department has specific requirements for students concentrating in that department. ESP 201a or ESP 201c and ESP 202b or ESP 203d, HPM 221a,b and a case studies course are required for all MPH students. The CAD has voted the following procedures in the event of failure in one or more of these courses:

1. If a student fails two or more of these courses, no makeup arrangements will be permitted.
2. If a student fails one of these courses *and* is in the first year of a two-year program, the course should be retaken in its entirety. If a course is repeated in its entirety, the initial failure, although it remains on the student's record, will not be counted in the final grade point average.
3. If a student fails one of these courses *and* is in the last (or only) year of a program, a makeup tutorial is permitted at the discretion of the department chairman. The specifics of any makeup tutorial must be approved by the CAD each year. In general, the following procedures apply:
   a. A makeup tutorial should be graded pass/fail and will receive academic credit. The tutorial need not be for as many credits as the failed course; 2.5 credits is the recommended credit load for the tutorial.
   b. The makeup tutorial should have a final examination.

c. At the successful completion of the makeup tutorial, the department chairman should certify to the CAD in writing that the student has met minimum departmental requirements for the subject matter of the failed course.
d. The makeup tutorial does not replace the original failure which remains on the permanent record and is included in the final grade point average.

Final Examinations

Final examinations are ordinarily scheduled during the last week of each period. Final examinations must be taken and may not be repeated, except that, with the concurrence of the Assistant Dean for Student Affairs and the Chairman of the Department concerned, a faculty member responsible for a first-quarter fall course ("a" period) may offer a re-examination to students who have failed the regular final examination. A student who does not attend a final examination in a course will be given a grade of ABS. At the discretion of the Assistant Dean, makeup examinations may be given to students who were absent from the regularly scheduled final exam because of significant medical or personal reasons. In such cases, the Assistant Dean should, if possible, be given notice in advance of the beginning of the examination. Unexcused absences remain ungraded, and no credit is given for the course. Incompletes may not be given for unexcused absences from final examinations. Incompletes should be given only in cases in which the student and the instructor have agreed in advance upon a plan to complete the course satisfactorily. An Incomplete not completed by the end of the next term automatically becomes a Failure.

Grade Points

Grade points for a course will be determined by multiplying the number of credit units times the value associated with the grade assigned. The grade point average is defined as the sum of grade points earned divided by the total credit units for which grade points were calculated. Pass/fail credits are *not* included in computing grade point averages.

Grade Point Averages

The minimum standard for satisfactory work at the School is a B− average or a grade point average of at least 2.70. In some departments and programs, however, students will be expected to maintain an average above this minimum. Such requirements will be stated by the department in advance. A student whose record is below the standards of the department may, at the end of a given term, be informed by the Committee on Admissions and Degrees, upon recommendation of the department, that he or she may re-register subject to specific academic conditions, which if not fulfilled by the date specified may result in the termination of degree candidacy.

Alternatives

During registration, each student should mark on the course form which grading system—ordinal or pass/fail—is desired. Note that 300-level courses are graded only P/F. In the event of cross-registration, the grading system of the host school must be used for that particular course. Students planning future application to doctoral programs are advised to elect the ordinal system. Doctoral students must elect the

ordinal system in all courses offered for their major or minor fields. Students should discuss the advantages and disadvantages of both the ordinal and P/F grading systems with their advisers before selecting an option.

Ordinal grades provide a more definitive record of student performance and are therefore useful in future job and academic applications. An advantage of the P/F system is that students will not be inhibited from taking courses of interest outside their areas of concentration for fear of obtaining poor grades. Also, some students already have advanced professional degrees or job experience which makes taking more than the required number of ordinal credits unnecessary for their future plans.

In selecting grading options, students must consider both minimum School distribution requirements and any additional requirements set by their department or program.

Changes in Grades

Final authority for the designation of grades rests with the principal instructor in each course. Once a grade has been reported in writing to the Registrar's Office, the following applies:

1. If the grade in question is to change an Incomplete to a final grade, it is sufficient to send this grade to the Registrar.
2. If the grade change is because of a clerical error in reporting the original grade, then the new grade and a letter explaining the circumstances must be sent by the instructor to the Dean for Academic Affairs, who may authorize the Registrar to change the grade.
3. If the grade change is due to an error in judgment or because of new information regarding the student's performance, the instructor must submit the request as above to the Dean for Academic Affairs. In addition to the Dean's approval, the grade change must be approved by the Committee on Admissions and Degrees.
4. For grade changes other than resolving Incompletes, the instructor is ordinarily expected to indicate that he or she has reviewed the work of the other students in the course in order to determine that no similar errors have been made and gone uncorrected.

Tuition and Fee Schedule

The tuition and fees for the academic year 1984-1985 are listed below:

Degree Candidates	
Full-time resident tuition	$8,600*
Half-time resident tuition (Up to 20 credit units per year.) (For students entering Fall 1984, credits over 20 will be charged $210 per credit.)	4,450*
Doctoral full-time reduced tuition	4,500*
Doctoral half-time reduced tuition	2,400*
Doctoral facilities fee (resident)	1,220*
Nonresident guidance fee (less than half time)	410
Leave of Absence	
Active file fee for each term that student is on leave	50
Special Students	
Enrolled for 10 or more credit units — Tuition as stated above for full-time or half-time attendance.	
Enrolled for 6 to 9 credit units —	
First credit unit of work per term	360*
Each additional credit unit of work per term	210
Enrolled for 1 to 5 credit units —	
Per credit unit of work per term	210

*These starred amounts include the UNWAIVABLE annual University Health Service fee ($300 est.) for all *resident* students enrolled for 6 or more credit units.

Summer Session	
Five credit unit summer program for degree candidates who register and receive credit for research or supervised study during summer session. Tuition for summer school courses may not be credited toward any tuition requirements for the degree.	1,050
Dissertation Fee	
Final doctoral tuition fee. For the registration period in which a dissertation is formally approved and accepted by the Department and Committee on Admissions and Degrees, a doctoral degree candidate must have paid at least half of the current Facilities fee.	305
Late Fees	
Late registration fee	per week 25
Late course form fee	per week 25
Drop/Add Fee	
Within published deadlines — per drop/add petition	10
After published deadlines — per CAD petition	25
Hospital Insurance (Blue Cross/Blue Shield)	(est.) 300

Blue Cross/Blue Shield (BC/BS) insurance is charged separately. All students are automatically enrolled in the BC/BS plan and it is compulsory for nonimmigrant foreign students. U.S. students who have comparable medical insurance *and* submit a waiver form within two weeks of registration may elect not to enroll in BC/BS. *Students who fail to file waivers will be responsible for any fees billed for that term.* Waivers for BC/BS insurance are approved *only* by the Director of the University Health Services. A BC/BS student insurance plan provides coverage for many costs of medical care not offered at the University Health Services. Coverage under this plan extends from September 1 through August 31. Enrollment is possible only in September and January.

Nonresident doctoral students are not automatically enrolled in any Harvard health plan. Nonresident doctoral students who wish to have BC/BS insurance coverage must file special forms with the student insurance office in Holyoke Center within two weeks of the start of the term. Obtaining coverage is optional for students who will be residing outside the United States. However, this BC/BS insurance is mandatory for all nonimmigrant foreign students in nonresident status *within* the United States.

Final Doctoral Tuition Fee

For the registration period in which a dissertation is formally approved and accepted by the department and the Committee on Admissions and Degrees, a Doctor of Science or Doctor of Public Health candidate must have paid at least half of the then current facilities fee. The fee for 1984-85 is $305. Students graduating in November or March who wish to maintain health insurance during the final term are required to pay one-half the University Health Services fee ($150) and one-half the Blue Cross/Blue Shield fee ($150). Coverage terminates upon awarding of degree.

Payment of Fees

No student will be permitted to register in any term until all money due from prior term bills and at least one quarter of the commencing term's tuition and fees have been paid in full or satisfactory arrangements have been made either through the School of Public Health's Financial Aid Office, or through the Special Billing Department of the Harvard University term bill office (for students requiring third-party billing). Students not enrolled in the extended payment plan must pay the full amount by the dates indicated in order to register. To register for the extended or monthly payment plan (four each term), sign the enrollment card at the term bill office and pay one quarter of the tuition for that semester plus a $25 processing fee per term.

Special students enrolled for less than 10 credits are required to pay all tuition and fees for the term in full when they register. In event of withdrawal, tuition will be prorated according to the schedule on page 100. All other bills for tuition and fees will be issued and payable as follows:

Student term bills for the fall term will be issued on July 21 and will be payable *in full* by August 17.

Bills for the spring term will be issued in early January, and will be payable *in full* by January 20.

Students who are candidates for degrees must have paid all bills to the University at least three days before the day upon which the degrees are to be voted by the Faculty of the School of Public Health. Graduating students who make payments late in the term should obtain a receipt and bring it to the Registrar's Office prior to the degree voting day.

A student who leaves the University for any reason whatever must pay all charges against him or her immediately upon receipt of a bill from the Office of Fiscal Services. Every student is held responsible for the payment of fees until he or she has notified the Registrar *in writing* of his or her intention to withdraw from the School. A student who fails to submit written notification of withdrawal will be liable for tuition and fees for the term.

A student who leaves the School during the academic year is responsible for tuition charges in accordance with the following:

Leaves by		**Percent of Total**
First Term	*Second Term*	**Semester Charges**
October 12	February 22	25%
November 9	March 22	50%
December 7	April 19	75%

Students leaving after December 7 and April 19 of the first and second terms, respectively, are responsible for full tuition charges. Students receiving financial aid should read the information on page 105 regarding refunds.

Ordinarily, term bills are send to the student at his or her local address unless the Office of Fiscal Services is requested in writing to send them elsewhere. Any student whose indebtedness to the University remains unpaid on the date fixed for payment may be deprived of the privileges of the University. Reinstatement is obtained only by consent of the Dean of the School in which the student is enrolled.

Registration and Tuition Guidelines

Degree Candidates

After admission to the Harvard School of Public Health (HSPH) and until fulfillment of the requirements for the degree, all degree candidates must be registered continuously in one of the following registration categories:

1. Resident students
2. Nonresident doctoral students
3. Students on leave of absence

All degree candidates must pay the appropriate tuition rate for each registration period as described on page 98; tuition may not be paid on a "per credit" basis, except for half-time degree candidates who take over 20 credit units for the year. To qualify for an educational loan, a student must be registered for no less than a half-time study program.

Tuition for summer school courses and additional tuition paid for credits over 20 per year may not be credited toward any tuition requirements for the degree.

1. *Resident Students*
   All degree candidates who are enrolled in courses or who intend to use any Harvard academic facilities must register as resident students. Master's degree students are charged full tuition for the entire period in which they are in full-time attendance.

   New Doctoral Students

   a. Students who have not previously attended HSPH will be charged a minimum of two years of full tuition and one year of reduced doctoral tuition.
   b. Students who have received a one-year master's degree from HSPH within three years of enrolling in a doctoral program in the same discipline as that of their HSPH master's degree will pay a minimum of one year of full tuition and one year of reduced doctoral tuition.
   c. Students who have received a two-year master's degree from HSPH within three years of enrolling in a doctoral program in the same discipline as that of their HSPH master's degree will pay a minimum of one year of reduced doctoral tuition.
   d. Students who have received a Master of Public Health degree and a Master of Science degree from HSPH within three years of enrolling in a doctoral program in the same discipline as one of their HSPH master's degrees will pay a minimum of one year of reduced doctoral tuition.
   e. In the year(s) following the year in which reduced doctoral tuition is paid, a facilities fee will be charged all doctoral students. This fee enables students to use Harvard academic facilities and the University Health Services.

   Returning Doctoral Students

   Currently enrolled doctoral students will not be granted retroactive credit for tuition previously paid. However, current students who have paid three years of full-time tuition will be charged only the facilities fee.

   Part-Time Resident Students

   Any degree candidate who registers for less than full time must in any event fulfill the full-time, full-tuition requirements for the degree.

   Full-Time and Part-Time Student Status

   For degree candidacy, financial aid, loan requirements, and immigration, definitions of what constitutes a full-time student are required. (See information on degree candidates on page 89).

   The following guidelines will be used.

   a. Students who are accepted to two one-year programs (40 credit units each) and who are awarded one degree at the end of the

first year must fulfill the requirements for a one-year (40-credit) program during the second year. Credits may not be carried over from the first program into the second.

b. Persons in a 60-credit master's degree program must follow the guidelines for students in an 80-credit degree program, except that all 60 credits must be taken within three consecutive terms.

c. Students who have received academic credit for work done at HSPH prior to enrollment as degree candidates must fulfill the same requirements as other students in order to be registered as full time. For example, if credits have been earned at HSPH for courses taken as a special student or as a Corporation Appointee, 40 credits must still be taken during a one-year program to be registered as a full-time student.

d. Exceptions to these guidelines are not encouraged. Students requesting an exception must petition the CAD.

2. *Nonresident Doctoral Students*

Doctoral students who no longer reside within a 50-mile radius of Boston, and who are engaged in less than half-time work on the degree, and who have received permission from their department and the Committee on Admissions and Degrees to pursue a portion of their programs as nonresidents, will be charged the nonresident doctoral fee. Students in this category normally will have completed payment of at least the required two years of full-time tuition and one year of reduced doctoral tuition before applying for nonresident status; they must in any case complete this payment prior to their graduation and will be billed accordingly while in nonresident status.

Nonresident doctoral students are charged the nonresident doctoral guidance fee, which covers periodic consultation with the student's doctoral adviser, but does not provide for the use of Harvard facilities or for the issuance of a Harvard identification card. Also, as noted above, a student registered for less than a half-time study program may not qualify for deferment of an educational loan. Upon expiration (or earlier termination) of CAD permission for nonresident status, or for a term in which use of Harvard facilities is required, the appropriate resident rate will be charged.

3. *Students on Leave of Absence*

Degree candidates who will not, during a given registration period, be engaged in study or research for a degree from the School, and who will be making no use of Harvard facilities, must apply to the Registrar for a leave of absence. Leaves of absence are ordinarily granted for a maximum of two registration periods and require approval of the student's department and the CAD.

Students on leave of absence are required to pay the active file fee to maintain their degree candidacy. Upon earlier expiration (or earlier termination) of CAD permission for leave of absence, students will be charged the appropriate tuition rate.

Termination of Degree Candidacy

Students who do not intend to register in any one of the categories noted above must terminate their candidacy for the degree. Such students are required: (1) to file in the Registrar's Office a written notice of intent to withdraw; (2) to inform their department; and (3) to arrange an exit interview with the Financial Aid Office or the International Office, when appropriate. If students do not terminate their degree candidacy formally but fail to register for a full term or longer, degree candidacy will be terminated automatically. Students who are withdrawn must apply for re-admission.

The CAD, with departmental recommendation, may terminate a student's degree candidacy on the basis of unsatisfactory performance in course work. Candidacy also will ordinarily be terminated in the case of a student who has exceeded the five-year limit for completion of degree requirements following registration as a doctoral candidate. Doctoral candidacy may be terminated as a result of failure to submit an acceptable proposal for the thesis. Also, the Administrative Board may recommend termination of candidacy in matters involving academic discipline.

A student who wishes to reactivate degree candidacy should file an application for re-admission, which must be approved by the department and by the CAD. Prior to re-admission, the student must pay any outstanding bills to the University, as well as the then current active file fee for each registration period that has elapsed since the termination of candidacy.

Nondegree Candidates

Requirements for admission to nondegree programs are described on page 87.

Special students registered for full-time or for half-time study programs will pay the corresponding tuition rate; those registered for less than half time will pay tuition on a "per credit" basis as outlined in the tuition and fee schedule.

Field Studies

Field opportunities, listed under each department's course offerings and bearing the course number 330, often entail travel expenses that must be met by the student. Information about estimated expenses should be obtained from the appropriate department.

Living Expenses

Living costs in the Boston area are higher than in most areas from which students come. The following are minimum amounts estimated that students will need in the academic year 1984-1985 to cover expenses for approximately 10 months.

A single person will need at least $18,900, in addition to relocation costs, to cover the cost of tuition ($8,600), health insurance ($300), books ($500), rent ($3,750), local travel ($600), and other living expenses ($5,150) for approximately 10 months. A family of four will need at least $26,900, in addition to relocation costs, to cover tuition ($8,600), health insurance for student ($300), books ($500), rent ($6,000), local travel ($600), and other living expenses ($10,900), including medical care for spouse and children.

Applicants who plan to enroll in a two-year program should allow for proportionate additional expenses for the summer months and a six to eight percent increase for the academic year 1985-1986.

Housing

The Henry Lee Shattuck International House is an apartment residence operated on a nonprofit basis by the School for its full-time students and their families from the United States and abroad. Located at 199, 203, and 207 Park Drive, within walking distance of the School, the House consists of 72 individual apartments, each with its own kitchenette and bath.

All apartments are rented furnished with basic items except for linens, blankets and kitchen utensils. No unfurnished units are provided. The monthly rent charge includes all utilities — hot water, heat, gas, and electricity — but not telephone service.

Applications should be submitted by May 15, although late applications will be considered as long as space is available. For application forms and more detailed information, write to Carol O'Connell, Office of Student Affairs, Room G-4, Harvard School of Public Health, 677 Huntington Avenue, Boston, Massachusetts 02115.

The Office of Student Affairs maintains an up-to-date list of private housing and local real estate agencies.

The Harvard University Housing Office in Cambridge arranges for housing in University-owned complexes. Information and application forms may be obtained by writing to the Harvard University Housing Office, 7 Holyoke Street, Cambridge, Massachusetts 02138. A copy of the student's letter of acceptance from the School must be enclosed to prove affiliation. This Office also maintains listings of apartments and houses not owned by the University. These listings must be viewed in person; information is not given out by mail or telephone.

Student Health Service

Under the University Health and Insurance Plan, students at the School of Public Health receive medical care and insurance toward hospital expenses. Medical care is provided through the facilities of the Medical Area Health Service, located in Vanderbilt Hall. The hospitalization insurance extends for a period of 12 months from September 1, and covers hospitalization in Boston and elsewhere. Nondegree, post-doctoral research and teaching Fellows who are in a training status are required to enroll in the Student Health Plan unless they can show that they have comparable coverage.

In addition, a prepaid program for spouses (including maternity benefits) and children of full-time students is available. As the plan provides extensive benefits for ambulatory and inpatient care, all who are eligible are strongly advised to enroll. Its coverage, like that of the Student Plan, extends for a period of 12 months from September 1, and provides full semiprivate hospitalization benefits. A descriptive brochure about the plan for dependents is sent to students before registration or may be obtained from the Registrar.

Any illness necessitating absence from classes should be reported to the Medical Area Health Service Office by the student or an attending physician, and to the Registrar's Office at the School. A physician from the Medical Area Health Service, on call 24 hours a day, can be reached through the switchboard of Harvard University.

For further information, contact the Director, Medical Area Health Service, 275 Longwood Avenue, Boston, Massachusetts 02115. Telephone: 617-732-1370.

Loans and Fellowships

The Harvard School of Public Health is a participant in the Harvard University Guaranteed Student Loan (GSL), PLUS loan, and National Direct Student Loan (NDSL) programs. These programs permit a student who is either a U.S. citizen or has immigrant status to borrow up to $5,000 a year under the GSL program, providing the student has less than $20,000 in outstanding loans through this program and up to $3,000 a year through the PLUS or NDSL programs, providing the student passes certain eligibility requirements.

In addition to the above loan programs, a full-time student may borrow through the Health Education Assistance Loan program (HEAL), a federally insured loan program for a graduate student who is either a U.S. citizen or has immigrant status. Eligible lenders are participating banks.

Some fellowship support is available through departments and special programs from federal and nonfederal sources for qualified students in a variety of fields. In addition, there are funds available through the College Work Study program for eligible full-time students.

If a student who is receiving any form of financial aid withdraws and is entitled to a refund, a portion of that refund may be returned to the financial aid fund. A special refund rule applies to these funds: National Direct Student Loans, Guaranteed Student Loans, PLUS loans, and Health Education Assistance Loans. These loans must receive the same proportion of the refund as the proportion which each constituted of the original aid package.

As a matter of policy, the Harvard School of Public Health does not discriminate among applicants and students in fellowship and loan programs on the basis of race, religion, sex, national origin, color, creed, handicap, sexual orientation, Vietnam-era or veteran status, marital or parental status, or age.

Detailed information about fellowships and loans can be obtained by writing to Ms. Margaret C. Salmon, Director of Financial Aid, Harvard School of Public Health, 677 Huntington Avenue, Boston, Massachusetts 02115.

Scholarships

The Committee on General Scholarships and the Sheldon Fund administers a number of scholarships which are open to applicants from all Schools of the University. These include Travelling Fellowships and Restricted and Unrestricted Scholarships. Eligibility for many of these

funds is very specific and varies according to terms of donors. Nomination for these scholarships must be made by the Director of Financial Aid. For a complete list of University Scholarships, applicants should consult the General Catalogue Issue of Harvard University.

Some awards are made available through departments or the Financial Aid Office and are based on scholastic achievement. One example is the John E. Thayer Scholarship, which is the Bequest of John E. Thayer, the income to be paid "to the ten most meritorious scholars in Harvard University every year — the income shall only be paid to such meritorious scholars as who actually need the same." This award is determined by the Committee on Financial Aid following the first semester of each academic year. The award is based on a review of the grade cards of second-year students who have elected the ordinal grading system and a needs analysis based on financial records on file in the Office of Financial Aid.

Office of Student Affairs

The Office of Student Affairs, which includes the Office of Career Services, attempts to meet the special needs of students, oversees student recruitment activities, plans orientation and commencement, and acts as liaison with the Alumni Office. Up-to-date information is maintained on housing, child-care facilities, transportation, and athletic outlets in the Medical Area, Boston and Cambridge.

The Coordinator of Career Services provides career counseling and maintains a resource center containing job listings and files on health care organizations. The Office contacts potential employers to acquaint them with programs at the School and to request information about job openings. Current positions (permanent, summer and part time) are posted and a bi-weekly Job Opportunities Bulletin is distributed to all students. Assistance in writing resumes, arranging for interviews and exploring career opportunities is available. The activities of the Office complement the efforts of departments, programs and faculty advisers. Data collected about positions and salaries of graduates is available to prospective students.

The Assistant Dean for Student Affairs is responsible for assisting handicapped students in adapting to life at the School.

Further information can be obtained from the Assistant Dean for Student Affairs, Harvard School of Public Health, Room G-4, 677 Huntington Avenue, Boston, Massachusetts 02115.

Lockers and Mailboxes

During Orientation, the Office of Student Affairs assigns each student a locker with a combination lock and a mailbox. The lockers are located on the ground, second and fifth floors of Kresge; the mailboxes are on the G-level of Kresge. Some departments also provide student mailboxes. Announcements about course changes, student events, Student Coordinating Committee business, and numerous other items of School concern are distributed through the HSPH mailboxes. In addition, faculty members often send notices to individual students through this internal mailing system. It is important to check mailboxes regularly for these communications.

Typists and Typewriters

HSPH does not have a typing pool for students. Typists seeking work make this known by placing notices on the bulletin boards at HSPH. An electric typewriter is available for student use in the cubical in the S.C.C. lounge area on the G-level in Kresge. Replacement ribbons for this typewriter can be obtained from the Office of Student Affairs.

Bulletin Boards

Many items of interest cannot be distributed individually to each student and are instead announced by postings on appropriate bulletin boards. Accordingly, it is useful to be aware of the variety of bulletin boards and to make a regular practice of scanning them. An important bulletin board to check is outside the Office of Student Affairs—it contains important academic notices from the Dean's and the Registrar's Offices. In addition, many listings from potential employers are listed

on the bulletin board in the G-level area. On the wall approaching the cafeteria on the first floor of Kresge is another set of bulletin boards, containing miscellaneous postings by students or persons outside the School. Next to the Kresge elevators on most floors is a bulletin board which announces academic events and public or professional presentations in the Medical Area.

Most departments maintain a bulletin board where relevant material is posted, including job inquiries from employers.

Child Care Facilities

Although there are a number of child care facilities in the area, they are quickly filled, so arrangements should be made as early as possible. Child care facilities are located in Cambridge and the Medical Area. For further information provided by the Office of the Child Care Adviser, call 495-2851.

The Student Affairs Office will be happy to answer any further questions about available child care facilities.

Protection of Rights and Privacy of Students

The School of Public Health has adopted policies and procedures in compliance with the Family Education Rights and Privacy Act of 1974, which is commonly referred to as "the Buckley Amendment." Copies may be obtained from the Registrar's Office, Room G-4, 677 Huntington Avenue.

The Buckley Amendment was designed to protect the privacy of student educational records, afford students and former students the right to inspect the records that directly concern them, and provide students and former students the right to question and challenge the content of their educational records through formal hearings.

General records are compiled by the Admissions Office. These include materials furnished by the student, such as application forms and personal statements, references, transcripts, and other materials from third parties. These files are not available to students until they register at the School. Once a student registers, these folders are transferred to the Registrar's Office, where they are held until the student graduates. Copies of any correspondence with the student are added to these folders. In addition, if a student applies for financial aid, separate records of these transactions are kept in the Financial Aid Office.

Those at the School who have access to student records are the student's academic adviser, the student's department chairman or program head, departmental evaluation committees where appropriate, the Committee on Admissions and Degrees, and the Dean's Office. Students may request to see their records any time after registration by going to the appropriate office and requesting an appointment to inspect the records. Students wishing to discuss or question their records may speak with the Assistant Dean for Student Affairs. If a student wants to change or expunge something from the file, he/she should make a written request and file it with the Assistant Dean for Student Affairs. A committee, comprised of the Assistant Dean for Student Affairs, the Registrar and the Dean for Academic Affairs, will consider the request and

make a decision as to the appropriate action. If the requested change is not granted, the student may place in the file his/her explanation and objection to the information in question.

If a student believes that the School has failed to comply with the provisions of this amendment, or the implementing regulations, he or she may file a complaint with the Department of Education, Washington, D.C.

The following information is considered "Directory Information" and will be released on request without the student's specific written consent: dates of attendance, program and field in which they are enrolled, full- or part-time status, degrees received, address and phone number (unless the student specifically asks at Registration that these not be released), date and place of birth, degrees received from other institutions, and name of academic adviser. Transcripts of academic work, or grades in any form, will not be released without the student's specific authorization, except to appropriate faculty advisers and committees with responsibility for students' academic progress. Outside organizations or institutions are never given access to student records, but are permitted to interview the Registrar regarding the student's record upon presentation of signed consent forms. In such cases, every attempt is made to protect the privacy of the student and to prevent coercion by prospective employers.

Currently enrolled students who are applying for other programs at the School have the right to request that materials in their current student folder not be made available to the admissions committees considering applications.

Disciplinary Procedures for Students

Incidents of improper conduct by a student shall be reported at once to the Assistant Dean for Student Affairs. After investigation, the Assistant Dean will either resolve the issue informally, in consultation with the parties involved, or refer the matter to the Administrative Board.

The Administrative Board, after receiving a formal charge and report from the Assistant Dean, will convene to consider the case. It may call witnesses and review all evidence it deems relevant. The student involved may provide witnesses and other relevant evidence. The student may be present during the presentation of all evidence against him/her.

The Administrative Board must render a decision within a reasonable period of time, and may impose penalties ranging from Suspension to Probation. Expulsion requires a vote by the full Faculty. The Board's actions shall be separate from the responsibility of instructors to evaluate the academic performance of students.

Following the Administrative Board's decision, the student may appeal to the Dean of the Faculty for a review of the procedure. The Dean may reverse the decision only if there has been unfairness in the procedure or misconduct by the Board. The Dean will not reconsider the appropriateness of the finding or the penalty.

Student Conduct

Students are expected to respect the rights of the other members of the Harvard School of Public Health community and to maintain high standards of ethical conduct and personal integrity. A student is expected to do his or her own work, and incidents of intellectual dishonesty will result in disciplinary action. A student may not submit the same paper in more than one course without the prior written permission of the instructors involved.

Students are expected to abide by all city, state and federal laws, as well as University regulations, and infractions of the same may result in disciplinary action by the School.

Grievance Procedures for Students

For both legal and policy reasons, it is desirable that students at the School of Public Health have an established and approved mechanism by which serious grievances may be promptly and equitably resolved.

The following procedures are to be used by students for the resolution of grievances alleging unfair action on the part of the University Administration or Faculty, including discrimination on the basis of race, color, religious belief, sex (including sexual harassment), national or ethnic origin, handicap, or age.

The Informal Resolution of Grievances

A student with a grievance should initially take the matter to one of the following people: his or her adviser, department chairman, Dean of the School, Dean for Academic Affairs, Assistant Dean for Student Affairs, Affirmative Action Officer, or other appropriate faculty member or administrator. If the grievance cannot be resolved satisfactorily between the student and the initial faculty/administration contact, the student may, at his or her discretion, seek resolution via the formal procedure outlined in Section 2. The person investigating the grievance shall, at the request of the student, make a written report available to the *ad hoc* grievance committee in the event that resolution is not possible in the informal phase.

The Formal Grievance Procedure

An aggrieved student may, at his or her request, seek resolution of the grievance via the formal procedures outlined below.

1. A formal grievance is a complaint in writing from the student to the Assistant Dean for Student Affairs (in the event that the grievance is against the Assistant Dean for Student Affairs, the written complaint shall go directly to the Dean of the School) asking that an *ad hoc* grievance committee be appointed. The written complaint should be filed within two months of the event to which it refers and should include the following:
   a. Statement of the allegation
   b. Description of the alleged facts
   c. Name or names of the person(s) thought to be responsible for the alleged events and
   d. Other facts considered to be pertinent to the case.

2. The Assistant Dean for Student Affairs will then appoint an *ad hoc* grievance committee consisting of a representative of the Faculty Council, a member of the School's administration, and a student, chosen by the Student Coordinating Committee, who has completed at least one semester at the School. This *ad hoc* grievance committee will be appointed and convened within ten (10) working days of receipt by the Assistant Dean for Student Affairs of the written complaint; in all cases, confidentiality shall be maintained during the selection and appointment process. A quorum will require that all members be present. The Assistant Dean for Student Affairs will appoint the chairperson of the committee.
3. The *ad hoc* grievance committee shall investigate the grievance. This investigation shall include, but need not be limited to, the following:
   a. Meeting(s) with the person aggrieved and the person(s) (or department) grieved against and
   b. Consultation with such others as the *ad hoc* grievance committee shall deem necessary to provide a thorough investigation of the grievance, including scientific ramifications or concerns, and other mitigating or extenuating circumstances that bear upon the situation.
4. The *ad hoc* grievance committee shall expeditiously consider the facts of the case and present a report to the Dean of the School. The report shall include findings of facts and recommendations, if any. Every precaution shall be taken to ensure the confidentiality of information obtained at meetings of the *ad hoc* grievance committee. The Committee shall also make every effort to conclude the investigation quickly enough to prevent the situation from becoming irreversible and to take any needed remedial action.
5. Upon receipt of the report from the *ad hoc* grievance committee, the Dean of the School may do one of the following:
   a. Take whatever action, if any, he feels is warranted, using the report of the *ad hoc* grievance committee as advisory information or
   b. Return the matter to the *ad hoc* grievance committee for further consideration. This action will return the grievance to Step 3 of this procedure.
6. The final action of the Dean of the School constitutes the formal completion of the grievance procedure. The *ad hoc* grievance committee will then be discharged. Final action of the Dean of the School will be communicated to both the person aggrieved and the person(s) (or department) grieved against. Once the procedure is completed, all records of the meetings of the *ad hoc* grievance committee and the final report of the committee will remain in the possession of the Dean and will be held in strict confidence.
7. Any request for exceptions to the foregoing should be addressed to the Assistant Dean for Student Affairs. By mutual agreement of the

Assistant Dean for Student Affairs and the student, the stated formal procedure may be waived in favor of a procedure more appropriate to a particular circumstance.

Alumni Association

The School's Alumni Association has a membership of approximately 4,500 graduates located throughout the world. The Association is governed by an elected Council which meets twice a year, once in the fall at the APHA annual meeting, and once in the spring at the School. In 1977, the Association initiated the Margaret Dale Penrose Scholarship Fund, which has since been permanently endowed with gifts from Alumni and friends and a matching amount from the School. In 1981, the Association was instrumental in the establishment of an Alumni Fund for Student Assistance to which Alumni contribute annually. In addition to helping students in dire financial need, the Fund supports Alumni Scholarships that are awarded annually to doctoral students selected on the basis of merit and financial need. For information about Alumni activities, contact the Alumni Office.

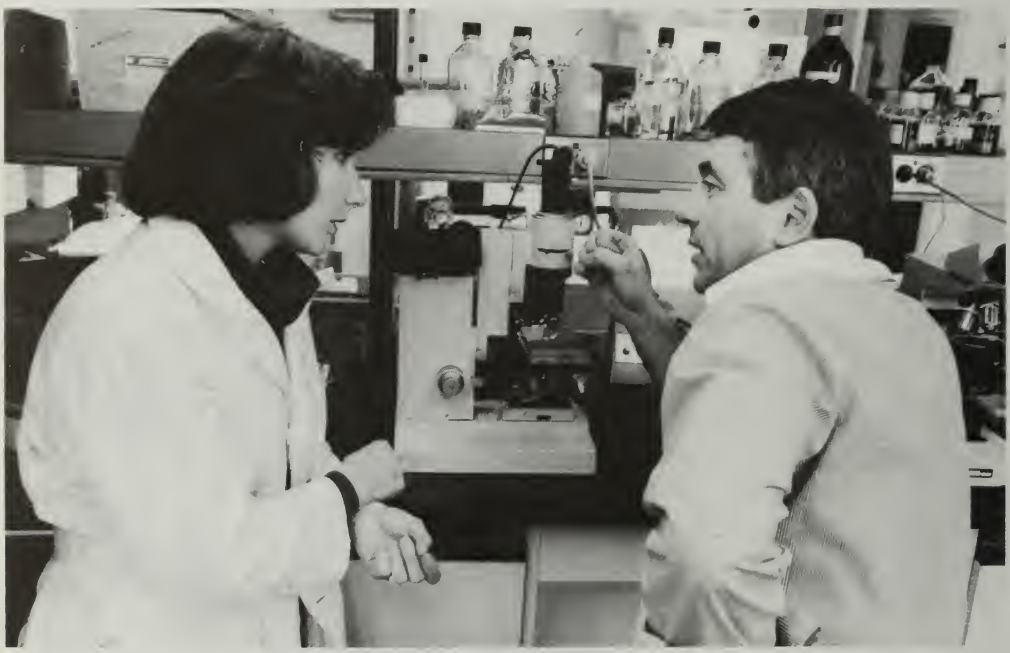
Courses of Instruction

In the course listings, course numbers from 100 to 199 indicate undergraduate and graduate courses; numbers from 200 to 299 indicate primarily graduate courses; and numbers from 300 to 399 indicate graduate courses of reading and research.

The letters "a," "b," "c," "d," "e," and "f" following the course number indicate the period(s) in which a course is given, with "a" denoting first period and "b", second period (fall); "c", third period and "d", fourth period (spring). The letters "e" and "f" indicate supervised special studies or field observations, usually during the one-week period between fall and spring terms or during the week of spring recess.

The credit assignment is given in units following the statement of number and length of sessions per week. Course titles in bold type are often followed by titles and numbers in roman face (enclosed in parentheses). This indicates that the course is also listed in other Harvard catalogs, namely, Arts and Sciences, and that the course credit is provided through that Faculty as well as through the School of Public Health, e.g., MCH 214a,b (HMS Geriatrics 702) or POP 209a,b (Biology 195).

The School reserves the right to make changes in the regulations and courses announced in this *Register*.



Dr. Juliet Fuhrman, postdoctoral Fellow, and Dr. Willy Piessens, of the Department of Tropical Public Health, examining cloned T-cell cultures.

Through its Office of Continuing Education, the School of Public Health offers a variety of short-term technical courses for professional public health personnel. Courses currently confirmed for presentation during the 1984-85 academic year are listed below. Additional information can be obtained from the Office of Continuing Education, Harvard School of Public Health (Telephone: 617-732-1171).

Occupational Health

Safety, Health and Ventilation Issues in the Laboratory
July 10-12, 1984
Certification Review for Occupational Health Nurses
August 13-17, 1984
Certification of Biological Safety Cabinets
September 10-15 1984
Fundamentals of Industrial Hygiene
October 15-19, 1984
March 25-29, 1985

Nuclear Safety and Radiation Protection

Environmental Radiation Surveillance
July 16-20 1984
Occupational and Environmental Radiation Protection
August 20-24, 1984
March 25-29, 1985
In-Place Filter Testing Workshop
August 20-24, 1984
June 10-14, 1985
Biological Effects of Ionizing Radiation
October 30-November 1, 1984
Radiation Protection Instrumentation
April 15-19, 1985
Control of Occupational Exposures in Nuclear Power Plants
May 13-17, 1985
Planning for Nuclear Emergencies
June 10-14, 1985

Environmental Management

Environmental Radiation Surveillance
July 16-20, 1984
Hazardous Waste Management
July 16-20, 1984
Risk Analysis in Environmental Health
September 18-20, 1984
Industrial Toxicology and Environmental Medicine
October 1-5, 1984

Control of Indoor Environments

Safety, Health and Ventilation Issues in the Laboratory
July 10-12, 1984
Clean Room Technology
August 14-16, 1984

Medical Sciences and Management

Diagnostic Parasitology in the Medical Laboratory
July 23-27, 1984
Certification Review for Occupational Health Nurses
August 13-17, 1984
Application of Personal Computers in Solving Public Health Problems
August 27-31, 1984
Industrial Toxicology and Environmental Medicine
October 1-5, 1984
Program for Health Systems Management
October 21-November 2, 1984
Biological Effects of Ionizing Radiation
October 30-November 1, 1984
Program for Chiefs of Clinical Services
January 13-25, 1985

ID 104a. Introduction to Selected Medical Problems for Non-Physicians
Lectures. *One 2-hour session each week. 1.25 units.* Dr. Braun.
Provides students who have limited backgrounds in biology and medicine with a familiarity of medical terminology, some knowledge of the pathophysiology of human disease and diagnostic methodology and information about the types of therapeutic regimens in current use. The symptoms which bring patients to health care providers will be described, and approaches to diagnoses and treatment will be presented.
Required for students in the two-year Health Policy and Management Program General Track.

ID 209a. Health Services in Developing Countries
Seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Cash, Dr. Koch-Weser.
Provides a broad overview of health and health care problems in developing countries. Central issues include: ecologic, environmental and other characteristics of developing countries affecting health; analysis of their health problems, the alternative approaches to solving them, the policy and planning issues in applying solutions, and the organizational alternatives for utilizing health resources; the nature, composition and training of the health team for use at the local and district levels; and the relation of health to development and the position of health in national planning priorities.

Preference given to students who have previously been involved in international health activities.

ID 212c. Biomedical Writing
Seminars. *One 2-hour session each week. 2 units.* Dr. Chernin.
Writing scientific papers is an integral part of the research process. This course develops practical skills and experience in planning and writing articles that meet the editorial demands of biomedical journals. The salient elements of a well-prepared article — logical organization, clear and concise scientific prose, and understandable tables and figures — are emphasized by criticizing short papers written by the participants on biomedical subjects of their own choice.
Enrollment limited to 10 students and requires approval of the instructor at least two weeks before the quarter begins. This course will be given pass/fail.

ID 216c. Health Aspects of Nuclear War (HMSC-PMCE 709)
Lectures. *Two 1-hour sessions each week. 1.25 credits.* Dr. Abrams, Dr. Lown, Dr. Mack.
Designed to introduce students to the medical dimension of thermonuclear weapons and war. Topics will center about the medical consequences of nuclear weaponry and war. Background material will include brief surveys of the physics of weaponry, modern weapon delivery systems, biological and ecological effects of radiation. Consequence of use of tactical weapons, limited nuclear war and full-scale nuclear exchange will be considered. The medical needs, available facilities and medical and psychosocial problems of survivors are discussed.

ID 217c,d. Capitalism, Socialism and Public Health
Lectures, seminars. *One 2-hour session each week. 2.5 units.* Dr. Lewontin, Dr. Levins, Visiting Lecturers.
General course contrasting the analysis of problems in public health, nutrition and population by Marxist and capitalistic social and economic theories. Topics include: Marxist economics and social theory, population control, "green revolution," nutrition planning, maternal and child health, and occupational health.

ID 220c,d. Workshop: The Design of Development Programs and Projects (KSG-S-562)
Seminar. *Two 1½-hour sessions each week. 5 units.* Dr. Thomas.
Draws heavily on students' own experience and working knowledge of analytical techniques. Attempts to synthesize practical and educational experience to provide the student with a stronger set of skills for future participation in development programs. Emphasizes both the analysis of issues from a political economy perspective and the practical skills of group work, negotiation, memo writing, and verbal presentation in simulated practical situations. Students are expected to have prior experience in, and career commitment to the field of development.
Enrollment subject to approval of the instructor.

ID 221c. Case Studies in Decision Making in the Control of Diseases of Public Health Importance

Lectures, team meetings. *Two 2-hour sessions each week. 2.5 units.* Dr. Nichols, Guest Lecturers.

Cases drawn from domestic and Third World sources are studied from the standpoint of decision makers in the control of diseases of public health importance. Students in teams will propose solutions to problems after utilizing information drawn from a spectrum of sources, including: molecular biology, host-parasite interactions, epidemiology, management of resource allocations, cultural and socio-economical constraints.

Enrollment limited to 50 and subject to approval of the instructor. No auditors.

ID 225c. A Case Study in Urban and Industrial Health Planning in a Developing Country

Lectures, small seminars, workshops. *Two 2-hour sessions each week. 4 units.* Dr. Nichols.

Curative and preventive medicine requirements for a large industrial project and surrounding city are studied, together with essential public health support services. Planning includes: definition of the problem; description of health hazards and load on the health services; alternate solutions; enabling and functional linkages required; functional programming, including proximity matrices, facilities, staffing, operational support, management and administration requirements, costing, and implementation.

Enrollment limited to 40 and subject to approval of the instructor. No auditors. Ordinal grades only.

ID 230d. Health of Community Populations

Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Gortmaker, Members of the Faculty, Guest Lecturers.

Principally targeted for those with interests in biostatistics, epidemiology, health policy and management. Focuses on the common diseases particularly affecting persons living in poverty or near poverty conditions in urban America. Discusses the impact of socio-economic, cultural and environmental factors upon ill health. Provides overview of types of data available from which to identify community health problems. Presents and evaluates case studies from local communities.

Prereq. ID 104a or equivalent.

ID 232d. Change Strategies at the Community Level

Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. J. L. Brown.

Assists students in analyzing and understanding functional aspects of communities, and in understanding the role of various institutions with respect to health, illness and the quality of life in communities. Analyzes variables which contribute to success or failure in altering health conditions, and the roles which health professionals play in altering the health status of populations.

Prereq. Present or past clinical/field experience.

ID 330f. Field Trip

Three-day period between c and d terms. 1 unit. Dr. Nichols.

Centers for Disease Control, Atlanta, Georgia.

The Centers for Disease Control (CDC) is a unique institution with many public health functions relevant to the educational and research interests of domestic and foreign students.

This field trip will give students an overview of the activities of the CDC, as well as an opportunity to meet individually with professional staff at CDC. Lectures and tutorials are provided related to the various disciplines at CDC, including occupational diseases, surveillance systems, epidemiology, control measures for both chronic and infectious diseases, and CDC's role in international health. Other topics will be arranged depending on the interests of the group. A resume of the material covered is required of each student.

BEH 201b. Health and Behavior: An Introduction to Behavioral Aspects of Public Health
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Members of the Department.
Reviews socio-demographic and socio-psychological factors in the initiation, maintenance and cessation of health-related behaviors. Considers behavior change strategies for primary and secondary prevention of disease from a health policy perspective and focusing on issues of compliance with medical regimens. Primary instructors are Dr. Cleary and Dr. Daltroy.

BEH 205c,d. Behavioral Sciences in International Perspective
Seminars, lectures. *One 2-hour session each week. 2.5 units.* Dr. Pierce.
Offers a survey of various behavioral sciences theories and practices. The aim is to demonstrate how such information can be modified for application to problems which are common to health problems in human society, regardless of locality. Readings, seminars, lectures, discussions, and written assignments will cover three broad areas: health, communication and cooperation.

BEH 214d. Behavior/Lifestyle Change and Risk Factor Alteration: Introduction to Methods
Lectures, discussions. *One 3-hour session each week. 2.5 units.* Members of the Department.
Focuses on the planning, implementation and evaluation of intervention programs addressing the primary prevention of disease. Examines risk factor reduction and life style changes in promoting health. Primary course instructor is Dr. Benfari.

BEH 215c. Inducing Social Change
Seminars. *Two 1½-hour sessions each week. 2.5 units.* Dr. Mertens.
Designed for various specialists in public health who are charged with responsibility for introducing changes in organizations and communities. The subject matter includes methods and theories of teaching, principles of individual and group psychotherapy, approaches to sensitivity training and group dynamics, and organizational theory. Techniques and procedures illustrating these theories are presented through readings, discussions and case illustrations.

BEH 216c,d. Case Studies in Health Promotion
Case studies. *One 2-hour session each week. 2.5 units.* Members of the Department.
Examines health promotion/education interventions in the U.S. and developing nations. Teaches techniques of intervention design using print and non-print media. Applies basic principles of education and social psychology. Primary course instructor is Dr. McArdle.

BEH 220c,d. The Epidemiology of Pathological Behaviors: Problems, Concepts and Methods
Seminars. *One 3-hour session each week. 5 units.* Dr. Wechsler.
Surveys the epidemiology of pathological behaviors and social pathologies. Topics include: psychiatric disorders, alcoholism and drug addiction, suicide, antisocial behavior, smoking, and anorexia. Provides an historical overview of studies using data from treatment services and institutions as well as field studies of the general population.

BEH 221c. Mental Health Factors in Organizations and Industry
Lectures, readings, case illustrations. *One 2-hour session each week. 2.5 units.* Dr. Mertens.
Covers psychological well-being of entire organizations, interpersonal conflict, psychological causes of industrial accidents, industrial and organizational stress, and the organization of psychological units in industry.

BEH 222c. Alcoholism and Alcohol Abuse
Seminars. *Two 1½-hour sessions each week. 2.5 units.* Dr. Wechsler.
Covers the diagnosis, prevalence and etiology of alcoholism and alcohol abuse. Topics include sex and cultural differences, high-risk groups, effects on health, accidental injuries, treatment, prevention, and public policy.

BEH 223d. Drug Addiction and Drug Abuse
Seminars, discussions. *Two 1½-hour sessions each week. 2.5 units.* Dr. McAuliffe.
Covers the prevalence of drug addiction and abuse. Topics include epidemiology, effects on health, etiology, prevention and treatment, and public policy.

Dr. William McAuliffe, Associate Professor of Sociology.

BEH 230c,d. Social and Behavioral Research Methods
Seminars. *Two ½-hour sessions each week. 5 units.* Dr. Gortmaker.
Covers aspects of behavioral research methods, including research design, measurement, sampling, data collection, and data analysis. By case studies, methodological readings and discussion, students learn the conduct and critical evaluation of experiments, surveys, index construction, longitudinal research, and observational studies.
Prereq. BIO 201a,b.

BEH 300a,b,c,d,e. Tutorial Programs
Time and credit to be arranged. Members of the Department.
Arrangements may be made with individual instructors to give a reading course on topics not covered in the Department's course offerings.

BEH 350. Research Training
Training in research is available through individual arrangements with the members of the Department.

The following courses, offered in the Harvard Graduate School of Education, are among those that may be of particular interest to students of the behavioral sciences. They are open to qualified students from the School of Public Health.

Human Development, Counseling and Consulting Psychology C-230. Community Psychology
Fall term. Katz.

Human Development, Counseling and Consulting Psychology C-240. Psychological Healing in Cross-Cultural Perspective
Spring term. Katz.

BIO 111c,d. Biostatistics for Medical Investigators
Lectures. *One 1½-hour session each week. 1 unit.* Dr. Zelen.
Topics include: role of randomization, replication and local control; planning of scientific experiments, therapeutic investigations and prognostic factors; concept of a population, mean and variance; confidence procedures for one and two population problems; analysis of proportions; survival data, life tables and maximum likelihood estimates.

BIO 112a. Computing Principles and Methods I
Lectures, discussions. *Two 1½-hour sessions each week. 2.5 units.* Members of the Department.
Introductory course designed to provide basic computer literacy to students from all disciplines. Topics include: computer terminology; the organization, capabilities and limitations of modern computer systems; data collection methods; programming principles; and the design and analysis of information systems.

BIO 113b. Computing Principles and Methods II
Lectures, discussions. *Two 1-hour sessions each week.*
Laboratory. *One 1½-hour session each week. 2.5 units.* Members of the Department.
A practical introduction to the principles of programming, using the language BASIC, in order to allow students to utilize personal computers recently acquired by the School. Topics include: information flow; stepwise refinement of algorithms; structured programming techniques; comparison of programming languages; and the use of statistical packages.
Prereq. BIO 201a,b, BIO 112a or equivalent.

BIO 201a,b. Principles of Biostatistics
Lectures. *Two 1-hour sessions each week.*
Laboratory. *One 2-hour session each week. 5 units.* Dr. Drolette.
Lectures and laboratory exercises acquaint the student with the basic concepts of biostatistics, their application and interpretation. Topics include: descriptive statistics, probability distributions, inference, tests of significance, association, and regression. Laboratory groups will be organized by areas of academic interest or specialization.
Note: This course cannot be counted as part of the credit requirement for a major or minor doctoral field.

BIO 202c,d. Statistical Methods for Epidemiologic Research
Lectures. *Two 1½-hour sessions each week.*
Laboratory (optional). *One 2-hour session each week. 5 units.* Dr. Begg.
Emphasizes concepts and methods for quantifying relationships between variables. Stresses issues in nonexperimental research. Topics include: measures of association, confounding and interaction, multivariate regression, analysis of covariance, one- and two-way analysis of variance, analysis of two-by-two contingency tables, logistic regression, analysis of matched pairs, analysis of rates, and survival data analysis.
Prereq. BIO 201a,b or equivalent.

BIO 203c,d. Statistical Methods in Experimental Research
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Finkelstein.
Uses extensive examples from laboratory science. Students learn to formulate a scientific question in terms of a statistical model, leading to objective and quantitative answers. Principal topics are analysis of variance and regression, including details of data-analytic technique and implications for experimental design. Also included are probability models and some computing.
Prereq. BIO 201a,b or equivalent.

BIO 204c,d. Vital and Health Statistics
Lectures and discussions. *One 2-hour session each week. 2.5 units.* Dr. Drolette.
Discussion of the types, sources, methods of collection, and uses of vital and health statistics for public health purposes. Effective use of existing data will be emphasized, together with consideration of incomplete data and sampling methods for obtaining new information, both nationally and internationally.

BIO 205c,d. Mathematical Foundations of Biostatistics
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Drolette.
Material includes: mathematical descriptions of commonly used distributions; standard procedures for estimating the moments of a distribution; and mathematical foundations of statistical inference, including the Neyman-Pearson lemma, the likelihood ratio, the central limit theorem, power and Bayesian inference.
Prereq. A course in elementary calculus.

BIO 207c,d. Survey Research Methods in Community Health
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Bailar.
Research design, sample selection, questionnaire construction, interviewing techniques, the reduction and interpretation of data, and related facets of population survey investigations are covered. Focuses primarily on the application of survey methods to problems of health program planning and evaluation. Treatment of methodology is sufficiently broad to be suitable for students who are concerned with epidemiological, nutritional or other types of survey research.

Topics in Biostatistics
Offered primarily for students majoring in biostatistics or epidemiology, although qualified students from other departments are welcome. The topics covered will vary from year to year, based on recent developments in biostatistics and the research interests of the instructor. Registration requires the permission of the instructor.

BIO 209c,d. Statistical Methods in Psychiatric Research
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Members of the Department.
Acquaints students interested in psychiatric research with methodological and design issues relevant to the field.
Topics include: Overview of the DSM III classification of mental disorders, psychatric rating scales, assessment of interrater reliability, Cohen's Kappa statistics, design and analysis of clinical trials in psychiatric research, life table and survival analysis methods, statistical models for genetics, longitudinal analysis and repeated measurements, and analysis of dichotomous and categorical outcomes.
Examples and data will be drawn from the instructor's experience. Guests speakers will participate.
Prereq. BIO 202 and another course in Biostatistics, or permission of the instructor.
Primary course instructor is Dr. Waternaux.

BIO 210c,d. Mathematical Models in Biology
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Feldman, Dr. Awerbuch.
Mathematical models as a basis for analyzing biological phenomena. An intermediate level course for students in laboratory science and biostatistics. Applied topics include: carcinogenesis, compartmental distribution of drugs and toxic substances, molecular binding, diffusion bioassay, membrane transport, cell and enzyme kinetics, physiologic scaling. Methodological topics include curve-fitting, experimental design, computer simulation.

BIO 211c,d. Discrete Multivariate Analysis
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Laird, Dr. J. Ware.
Deals with the use of log linear and logistic models for analyzing counted data. Emphasizes practical application rather than mathematical theory. Extensive use is made of computer packages for data analysis. Topics include: the analysis of contingency tables, chi-square and exact tests, measures of association, logistic regression, log linear analysis using iterative proportional fitting, and the binomial, multinomial and Poisson distributions.
Prereq. A course which includes the analysis of variance or permission of the instructor.

BIO 214c. Principles of Clinical Trials
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Gelber.
Designed for individuals interested in the scientific, policy and management aspects of clinical trials. Topics include: types of clinical research, study design, treatment allocation, randomization and stratification, data management and quality control, sample size requirements, patient consent, and interpretation of results. Students will design a clinical investigation in their own field of interest and will critique recently published investigations.
Prereq. Previous or concurrent enrollment in an introductory statistics course.
Required for students in the two-year Health Policy and Management Program Medical/Dental Track.

BIO 217a,b. Probability Theory and Applications
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Amato.
A course in probability theory fundamental to the statistics program. Topics include: algebra of events, axiomatic foundations, combinatorial probability, discrete and continuous sample spaces, Lebesgue integration, conditional probability and independence, random variables, generating functions and characteristic functions, standard distributions, expectation and variance operators, limit theorems, Poisson processes, and applications in health-related areas.
Prereq. Intermediate calculus (one or two semesters beyond elementary calculus).

BIO 218c,d. Statistical Inference (Statistics 211)
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Kempthorne.
A fundamental course in statistical inference. Topics include: methods of estimation, least squares, maximum likelihood, Bayesian methods, properties of estimates, confidence procedures, significance testing, likelihood ratio tests, goodness of fit tests, Neyman-Pearson theory, sufficiency, power and optimality, sequential analysis, nonparametric inference, and decision theory. The theory will be illustrated with examples from health-related research.
Prereq. BIO 217a,b or equivalent.

HPM-BIO 219b, 219c, 219d. Statistical Methods for Health Policy and Management
Lectures. *Three 2-hour sessions each week, 2.5 units each period.*
Dr. Lavin, Dr. Anderson.
(Course described under Health Policy and Management.)

BIO 220a,b. Multivariate Analysis for Quantitative Data
To be given 1985-86; offered alternate years.
Lectures, student presentations. *Two 1½-hour sessions each week. 5 units.* Dr. Ware.
An introduction to the fundamentals of multivariate analysis and the analysis of serial measurements. Topics include: the multivariate normal distribution, estimation of the mean and covariance matrix, Hotellings T^2, principal components, and factor analysis. Classical methods for the analysis of repeated measures and longitudinal data reviewed and newer methodology based on random effects and time series formulations presented. Computational issues discussed for both traditional and new methodologies.
Prereq. At least one statistics course beyond the level of BIO 202c,d. Knowledge of matrices and some familiarity with computer packages such as SPSS, BMD or SAS.

BIO 240c,d. Design of Scientific Investigations
To be given 1984-85; offered alternate years.
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Zelen, Dr. Laird.
Discusses those aspects of statistical theory and practice relative to the design of scientific investigations in the health sciences. Topics include: planning of sample surveys; basic principles of experimental design: randomization, replication and balance; randomization related to distribution-free methods; fixed, mixed and random models; experimental designs and techniques for reducing variability; block designs and analysis of covariance; human studies; multicenter longitudinal follow-up and observational studies; sequential studies; adaptive and allocation rules; special features with discrete response data.
Pre- or co-req. BIO 263a,b or permission of the instructor.

BIO 251a,b. Data Analysis
Lectures, discussions. *Two 2-hour sessions each week. 5 units.* Dr. Louis.
Discusses the statistical techniques necessary for analyzing data from clinical and biological studies. The concepts underlying statistical techniques are stressed rather than numerical calculation or mathematical derivation.
Prereq. Permission of the instructor.

BIO 261a,b. Theory of Biometry I
Lectures. *Two 2-hour sessions each week. 5 units.* Dr. Lagakos.
Discusses the theoretical basis of concepts and methodologies associated with survival data and censoring, nonparametric tests, competing risk models, carcinogenicity testing, and low dose extrapolation. Material is drawn from recent literature.
Prereq. BIO 211c,d or equivalent or permission of the instructor.

BIO 262c,d. Theory of Biometry II
Lectures, discussions. *Two 1½-hour sessions each week. 5 units.* Dr. Tsiatis.
A continuation of BIO 261a,b. Topics include: semi-Markov processes as models for disease processes, models of early disease detection, length-biased sampling, optimization and periodic screening, and methods for combining evidence from different experiments.
Prereq. BIO 261a,b.

BIO 263a,b. Regression and ANOVA
Lectures. *Two 1½-hour sessions each week. 5 units.* Members of the Department.
Examines the methods of least squares and maximum likelihood as applied to linear statistical models: multivariate regression, calibration, analysis of variance, and random effects models. Topics include: the development of hypothesis testing, confidence intervals and Bayesian techniques. Exercises and examples emphasize medical applications.
Prereq. BIO 202c,d, 203c,d or equivalent; familiarity with matrix algebra.

BIO 273a,b. Introduction to Computing
Lectures. *Two 1½-hour sessions each week.*
Laboratory. *One 2-hour session each week. 5 units.* Dr. Pagano.
Introduces the fundamentals of computing, emphasizing algorithms, information flow and the systematic design of programs in higher-level languages such as FORTRAN. Topics include: the structure of digital computers, programming languages, algorithm development and usage, systems of analysis, and systematic design of programs and computing systems.

BIO 274c,d. Statistical Computing
To be given 1984-85; offered alternate years.
Lectures. *Two 1½-hour sessions each week.*
Laboratory. *One 1½-hour session each week. 5 units.* Dr. Pagano.
Enables students to understand, properly use and possibly develop statistical algorithms or software. Topics are prompted by statistical procedures or biomedical applications and include: computer arithmetic, error analysis, numerical techniques, equation solving, matrix operations, approximation and smoothing, optimization, and simulation modeling.
Prereq. BIO 273a,b or equivalent or permission of the instructor.

BIO 275c,d. Applied Data Management
To be given 1985-86; offered alternate years.
Lectures, demonstrations. *Two 1½-hour sessions each week.*
Laboratory. *One 1½-hour session each week. 5 units.* Dr. Gelman.
Introduces management of data, both external and internal to computer data bases, concepts and techniques for handling data before it is ready for analysis, and practical aspects of computer data base design and usage. Topics include: data collection, forms and coding, data entry systems, quality control, data base structures (both logical and physical), data base management systems, file organization, and data models.
Prereq. BIO 273a,b or equivalent or permission of the instructor.

HPM-BIO 280c. Decision Analysis for Health and Medical Practices (Public Policy S-176m)
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Weinstein.
(Course described under Health Policy and Management.)

HPM-BIO 281d. Seminar on Clinical Decision Analysis
Seminar. *Two 2-hour sessions each week. 2.5 units.* Dr. Fineberg, Dr. Barnes, Dr. Weinstein.
(Course described under Health Policy and Management.)

BIO-HPM 285a,b. Health Risk Assessment and Appraisal
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Bailar.
Identification of hazards to health, dose-response relationships, exposure assessment, and their integration to an overall quantitative risk assessment. Special attention to environmental hazards that are ill-defined or hard to measure; heterogeneity in sensitivity; conflicting data; and non-random errors. Focus throughout is on risk assessment for use in setting policy.
Prereq. BIO 201a,b or equivalent.

BIO 310-315a,b,c,d. Tutorial Programs
Time and credit to be arranged. Members of the Department.
An opportunity for tutorial work is offered for interested and qualified students or small groups of students. Arrangements must be made with individual faculty members and are limited by the amount of faculty time available. These programs are open to students specializing in biostatistics and also to students in other fields who wish to go beyond the content of the regular courses. Six broad categories of this tutorial instruction are identified by the six course numbers below.

310 *Statistical Methods*
Guided study in specific areas of statistical methodology and application, including participation in the Departmental Journal Club.

311 *Teaching*
Work with the Department in laboratory instruction and the development of teaching materials.

312 *Consultation*
Work with members of the Department on current statistical consultation activities.

313 *Computing*
Guided study in scientific programming, numerical methods and data management.

314 *Study Design*
Guidance in developing statistical design of a study in which the student has a particular interest.

315 *Data Analysis*
Guidance in the statistical analysis of a body of data in which the student is interested.

Students may register for BIO 310-315 for a maximum of 5 credit units in the summer term.

BIO 350. Research
Candidates for the Doctor of Public Health, Doctor of Science or other doctoral degrees may arrange for individual research. The work may be part of the program for a doctorate in this Department or may be integrated with doctoral research in other departments.

CB 202b. Critiques of Current Literature in Virology and Immunology
Seminars. *One 2-hour session each week. 1 unit.* Members of the Department.
Papers on topics of general interest are selected from current periodicals and critically reviewed as to soundness of experimental design, validity and significance of results and conclusions, organization of manuscript, and clarity of presentation. The course will not be given if less than eight students enroll.

CB 204a,b. Immunobiology
Lectures. *One 1-hour session each week. 2.5 units.* Dr. Greene, Faculty and Guest Lecturers.
The anatomy and physiology of the immune system, fate of antigen, cell trafficking, cellular interactions, and regulation of the immune response, B and T cell recognition mechanisms. Principles of immunoregulation will be discussed in the context of current literature. Grade will be based on class participation and a paper. Students must have basic courses in microbiology and immunology and approval of the instructor.

CB 205a,b/205c,d. Departmental Seminar
Seminars. *One 1-hour session each week. 1.25 units each term.* Dr. Reynolds, Dr. Mullins, Members of the Department.
Students and faculty will present research seminars and current literature reviews. Topics include: chemical and viral carcinogenesis; DNA damage and repair; immunology; molecular biology; radiobiology; and virology.
Enrollment required for all doctoral students in Cancer Biology.

CB 207c,d. Radiation Biology
Not given 1984-85; offered alternate years.
Lectures. *Three 1-hour sessions each week. 5 units.* Dr. Little.
This course is divided into two parts: cellular and mammalian radiobiology. The first includes radiation chemistry, cell survival, transformation and mutagenesis, cytogenic effects, UV-photobiology, and cellular and molecular repair processes. The second covers effects of radiation in man and characteristics of internal and external human exposure. The biologic basis of the acute radiation syndrome and the human epidemiologic data for radiation carcinogenesis are emphasized.
Prereq. ESP 205a,b or college-level course in biology.

CB 212a,b. Introduction to Cancer Biology
To be given 1985-86; offered alternate years.
Lectures and discussions. *Two 1½-hour sessions each week. 5 units.* Drs. Kennedy, Eisenstadt, Cairns, Guest Lecturers.
Emphasizes current experimental approaches to studying cancer biology and the process of carcinogenesis. Topics include: the biology of cell modification and differentiation, the phenotype of the cancer cell, the properties of human and animal cancers, the process of cell transformation, mutagenesis, carcinogen metabolism and the general features of cancer epidemiology, and what these say about the causes of human cancer. Early in the course, several introductory lectures will be given to cover basic concepts of genetics, cell biology and molecular biology.
A background in some branch of science is desirable.

CB 217b. Human and Animal Virology
Not given 1984-85; offered alternate years.
Lectures. *Two 1½-hour sessions each week. 5 units.* Dr. Essex, Dr. Mullins.
Provides students with fundamentals of medical virology and introduces the new and relevant concepts emanating from recent and ongoing research. Topics include: virus-host cell interaction, pathogenesis, chronic and latent infections, epidemiology, environmental factors, host defense mechanisms, and community control measures. Selected virus groups discussed in detail. Suggest students discuss enrollment with instructor before registering.

CB 219c,d. Advanced Cancer Cell Biology
(Biophysics 203)
Lectures. *One 2-hour session each week. 5 units.* Dr. Haseltine, Dr. Chen (Associate Professor of Pathology, Harvard Medical School).
This is an advanced-level course for those planning to do research in the areas of carcinogenesis, tumor cell biology and cancer pharmacology. Examines the nature of cancer at the molecular level. Explores the differences between normal cells and tumor cells in animals and in tissue culture. Draws upon cell biology, viral oncology, tumor immunology, and genetics. Specific topics include: viral and chemical carcinogenesis, genetics of cancer and the transformed state, the nature of virus coded transformation functions, exogenous control of cell growth, the cell surface of normal and transformed cells, cell structure and mobility, the differences between benign

and malignant tumors, the problem of metastasis, and mutation and differentiation as models for cancer.
Suggested prereq. Cell Biology 202, The Biology of the Cancer Cell, Biochemistry 165, Oncogenic Viruses, CB 217b or equivalent.

CB 300a,b,c,d. Tutorial Programs
Time and credit to be arranged. Members of the Department.
Enrollment requires the consent of the staff member responsible for supervision of the research. The various subject areas are listed below by category.

302 *Viruses*
Dr. Essex, Dr. Haseltine, Dr. Mullins.
Isolation and identification of representative viruses by use of cell culture, animal inoculation and serologic and molecular biological techniques.

303 *Immunochemical Methods*
Dr. Grant, Dr. Greene, Dr. Essex, Members of the Department.
Methodology of immunofluorescence; enzyme-linked immunoassays; 51 Cr-release; chromatography; immunoelectrophoresis; monoclonal antibodies as applied to oncogenesis; and resistance to infectious viral agents.

304 *Public Health Laboratory*
Associates at the State Laboratory Institute.
The State Laboratory Institute is engaged in a variety of programs related to public health. These include the development, preparation and testing of new and standard serums, vaccines and blood fractions; research in various aspects of applied immunology; various aspects of diagnostic service in the fields of bacteriology, virology and congenital metabolic disorders; and field studies on arboviruses. Individual arrangements for study can be made in any of these programs.

305 *Tumor Biology*
Members of the Department.
Approaches and techniques for the study of cancer as an infectious disease. Procedures used to study tumor cell and tumor virus marker antigens and antibodies demonstrated. The significance of these markers for epidemiological, etiological and diagnostic investigations of various tumor systems of known and unknown causes discussed. The relationship between the immune response and the oncogenic process examined.

306 *Cellular Immunology*
Dr. Greene, Dr. Grant.
Examines the events following immunization of infection where the quality and quantity of the immune response is regulated by subsets or lymphocytes and their products. The mechanism of this regulation is explored by analyzing immunologic circuits, idiotypic recognition and antibody and cell mediated cytotoxicity.

307 *Radiobiology*
Dr. Little, Dr. Kennedy, Dr. Reynolds.
Current topics in Radiobiology at molecular, cellular and organismal levels. Cytotoxic, mutagenic and carcinogenic consequences of ionizing and nonionizing radiations are examined, with emphasis on genetic, physiologic and environmental factors that modify these biologic effects.

308 *Chemical Carcinogenesis*
Dr. Cairns, Dr. Eisenstadt, Dr. Haseltine.
Methodology and interpretation of tests for chemical carcinogens; mutagenesis and repair of DNA; the time course of the formation of cancer.

CB 350. Research
Qualified doctoral candidates, research Fellows and full-time special students may register for CB 350 to undertake original research in virology, bacteriology, immunology, or in one of the disciplines available at the State Laboratory Institute. A number of the current research activities of the Department are indicated under CB 300. Inquiries about specific research opportunities should be addressed to the Chairman of the Department.

ESP 201a, 201c. Principles of Environmental Health I
Lectures. *Two 2-hour sessions each week. 2.5 units.* Dr. Moeller.
Represents a first step in a review of the more important environmental health problems facing society. Topics include: environmental physiology, radiation protection, community air pollution, occupational health, and municipal water purification and wastewater treatment. Students will be required to develop and submit plans for a term paper.
Note: Students in the M.P.H. program are required to take this course, plus either ESP 202b or 203d. For convenience in scheduling, ESP 201 is offered in both the "a" and "c" periods.

ESP 202b. Principles of Environmental Health II
Lectures. *Two 2-hour sessions each week. 2.5 units.* Dr. Moeller.
Represents a continuation in the review of the more important environmental health problems facing society. Topics include: energy and the environment, environmental toxicology and hazardous waste management, environmental law and economics, accidents and public health, insect and rodent control, and environmental monitoring. Submission of a completed term paper is required.
Note: Students in the M.P.H. program are required to take either this course or ESP 203d, plus ESP 201. Enrollment in ESP 202b is recommended for students specializing in one or more of the programs of the Department of Environmental Science and Physiology.

ESP 203d. Principles of Environmental Health III
Lectures. *Two 2-hour sessions each week. 2.5 units.* Dr. Moeller.
Emphasizes environmental health problems in the less-developed countries. Topics include: individual household water supplies and wastewater treatment; basic sanitation; insect and rodent control; nutrition and foodborne diseases; housing and home accidents; operation, maintenance and management of environmental systems; environmental manpower and training; and the selection of appropriate technology for coping with such problems. Submission of a completed term paper is required.
Note: Students in the M.P.H. program are required to take either this course or ESP 202b, plus ESP 201. Because of the special orientation of the subject matter presented, it is suggested that students interested in environmental health problems in the less-developed countries enroll in ESP 203d. Students interested in the subject matter in this course, as well as that presented in ESP 202b, may take both courses, as well as ESP 201, and receive credit for all three courses (7.5 units).

ESP 204c,d. Environmental Health Evaluation and Management
Seminars, lectures. *Two 1½-hour sessions each week; additional computational sessions to be arranged. 5 units.* Dr. Harrington.
Introduces concepts and analytical methods for the quantitative evaluation and management of man's environment. Topics include: the development of natural resources, resulting environmental conditions and effects on human health. Where appropriate, mathematical models are developed and critiqued in a systems-analysis framework. Students are required to submit a term project.
A strong background in college-level mathematics is assumed.

ESP 205a,b. Human Physiology
Lectures, conferences, demonstrations. *Two 1-hour and one 2-hour sessions each week. 5 units.* Dr. Banzett, Members of the Department.
Students lacking a background in biology are offered an intensive introduction to biological principles and to the physiology of cells, organ systems and organisms. Some pathophysiology and a number of laboratory exercises are included.
Students without college courses in physics, chemistry and mathematics should speak with the instructor beforehand.

EPI-ESP 215c,d. Environmental and Occupational Epidemiology
Lectures, Seminars. *One 2-hour session each week. 2.5 units.* Dr. Monson, Dr. Robins.
(Course described under Epidemiology.)

ESP 221a,b. Pulmonary Cell Biology
To be given 1985-86; offered alternate years.
Lectures. *One 2-hour session each week.*
Laboratory/review sessions. *To be arranged. 5 units.* Dr. Brain, Members of the Department, Guest Lecturers.
Surveys pulmonary structure and function, trachea to alveolus, from the viewpoint of cell biology. Examines biological properties of the more than 40 cell types present and considers how cell

and tissue functions are integrated to provide for respiration, defense against airborne infection and other metabolic functions. Knowledge gained in this course helps prepare the student for research on the lungs and helps give insight into pulmonary disease.
Prereq. College-level course in histology or cell biology; otherwise permission of the instructor. Those without skill in interpreting morphological data will be at a disadvantage.

ESP 222c,d. Structure and Function of the Mammalian Respiratory System
To be given 1984-85; offered alternate years.
Lectures. *One 3-hour session each week.*
Demonstrations, discussions. *To be arranged. 5 units.* Dr. Brain, Dr. Leith, Dr. Mead, Dr. McMahon (Professor of Biology, Division of Applied Sciences), Dr. Taylor (Professor of Biology, Faculty of Arts and Sciences).
An introduction to the structure and morphometry of the respiratory system of mammals (from lung to mitochondria), integrating structural and morphometric information with physiological data. Requirements include lectures, demonstrations, discussions, term paper, and oral presentations.
Prereq. College-level course in histology or cell biology.

ESP 230a,b. Legal Aspects of Occupational Health Practice
Seminar. *One 1-hour session each week. 1.25 units.* Dr. Baker, Mr. Greer.
Stresses practical issues relating to litigation in the occupational health field. Specific topics for discussion include the nature of the legal system, legal remedies for injuries and occupational illness, legal aspects of relevant government regulations, preparing and giving expert testimony, and ethical issues in legal interaction. Especially directed to students in the Occupational Health Program who anticipate practicing in industrial hygiene or occupational medicine.

ESP 231c,d. Policy Issues in Occupational Health
Seminars. *Two 2-hour sessions each week. 5 units.* Dr. Boden, Mr. Barmack.
Examines the legal, economic and political foundations of occupational health activities in the United States. Enables students to develop the knowledge and skills in the above areas necessary to apply medical, industrial hygiene and statistical skills to achieve a healthful workplace. The roles of government, unions, corporations and research organizations are discussed.

ESP 232c,d. Introduction to Occupational Medicine
Lectures. *One 2-hour session each week. 2.5 units.*
Optional laboratory (Occupational Health Clinic). *One 3-hour session each week. 2.5 units.* Dr. Greaves, Dr. Baker.
Reviews the diagnosis and management of occupational diseases following exposure to specific workplace substances, including asbestos, lead, organic solvents, and other substances. Methods of diagnosis of early organ system effects of chemicals and techniques for assessing disability will be considered. The course is limited to physicians or others with adequate training by permission of the instructor.
Laboratory is limited to physicians and consists of supervised clinical work in one or two occupational health clinics.

ESP 233c. Industrial Toxicology
Lectures. *Two 2-hour sessions each week. 2.5 units.* Dr. Baker, Dr. Greaves, Members of the Department, Guest Lecturers.
Provides detailed information on organ system effects of exposure to workplace chemicals, with emphasis on understanding the pathogenesis of toxin-induced disease and on developing programs for early detection of such conditions. Pulmonary effects will receive particular attention. In the second half of the course, effects of exposure to common workplace toxins (e.g., asbestos, lead, solvents, pesticides, other metals, allergens) will be discussed.
Prereq. TOX 204a and ESP 251a.
No credit will be given for ESP 233 until successful completion of TOX 204a.

ESP 234d. Basic Problems in Occupational Health
Lectures. *One 2-hour and one 3-hour session each week. 2.5 units.* Dr. Ferris, Dr. Baker, Prof. Burgess, Dr. Smith, Members of the Department.
A problem-solving course using case studies and walk-through field trips to local industries. Emphasis is on the relation of working conditions to health, with special reference to the recognition, measurement and control of industrial hazards.
Prereq. ESP 251a.

ESP 235a,b. Critical Review of the Scientific Basis for Occupational Standards
Seminars. *Two 2-hour sessions each week. 5 units.* Dr. Monson, Dr. Robins, Dr. Eisen.
Designed to provide students with the opportunity to review the scientific basis for the association of selected occupational exposures with disease. Special emphasis is placed on critical

evaluations of the literature. Reviews occupational cancer and respiratory disease, pathophysiology of respiratory disease and epidemiologic approaches to chemical carcinogenesis. Attention will be directed specifically to the interface of science and regulatory standards.
Enrollment limited to 15.
Prereq. EPI 201a, BIO 201a,b, ESP 234d or permission of the instructors. EPI 212d recommended.

ESP 236c,d. Advanced Methods in the Analysis of Environmental Health Data
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Robins.
Addresses issues in the analysis of environmental health data and the implications for standard setting. Topics include the modeling of latency, interactions and the healthy worker effect in mortality studies; the fitting of cancer models (e.g., multistage) to data; the consequences of misclassification of non-categorical exposures; and the analysis of pulmonary function data (e.g., horse-racing effect, regression to the mean).

ESP 241a,b. Occupational Safety Science
Not offered 1984-85.
Lectures, discussions. *Two 1-hour sessions each week. 2.5 units.*
Covers the fundamental principles of occupational safety science. Topics include: theoretical models of accident causation, accident investigation procedures, systems analysis, safety standards, safety performance measurement, and product safety. Emphasizes the use of engineering controls and administrative practices to alleviate workplace hazards.

ESP 242c,d. Occupational Biomechanics and Work Physiology
Lectures. *Two 1-hour sessions each week.*
Laboratory. *Three 2-hour sessions during course. 2.5 units.* Dr. Snook.
Principles and occupational applications of biomechanics and exercise physiology are presented. Topics include: muscle anatomy and physiology, musculoskeletal mechanics, etiology of occupational musculoskeletal injuries and disorders, energy requirements of work, and systemic responses to work. Emphasizes the use of biomechanical and metabolic models to evaluate occupational stresses and establish safe work practices.
Enrollment limited to 30. Preference given to students in the Occupational Health Program (required for students in Industrial Hygiene/Safety).
Prereq. ESP 205a,b or equivalent.

ESP 243a,b. Ergonomics/Human Factors
Lectures, demonstrations. *One 2-hour session each week. 2 units.* Dr. Snook.
Emphasizes the design of the job to fit the worker. Specific problems are investigated which result from the nature of the job itself, e.g., low back injuries, fatigue, hand disorders, slips and falls, human error, and psychological stress. The physiological, psychological and anatomical characteristics of the worker are considered in the development of good job design principles.

ESP 251a. Health Hazards of Manufacturing Processes
Lectures, field trips. *One 2-hour and one 3-hour session each week. 2.5 units.* Prof. Burgess, Members of the Department.
Deals with the recognition of health hazards in the workplace and the atmospheric environment, using a unit operations approach to manufacturing processes. Designed as an introduction to other courses which consider the evaluation and control of hazardous conditions in the workplace and atmospheric environment.
Enrollment limited to 30 and subject to approval of the instructor. Preference given to students in the Department of Environmental Science and Physiology.

ESP 252b. Introduction to Industrial Hygiene
Lectures, seminars, laboratories. *Two 2-hour sessions each week. 2.5 units.* Dr. Smith, Dr. Ellenbecker.
Intended for physicians, nurses and other health professionals who will work with industrial hygienists in a variety of settings. Designed to familiarize these professionals with the methods used by the industrial hygienist in the prevention of occupational disease, thereby promoting a more effective working relationship. Topics include: the physical form of air contaminants, air sampling and analysis, engineering controls, and the preparation of survey protocols.

ESP 253c. Environmental Control: Industrial Ventilation (One half of ENG SCI 270)
Lectures. *One 2-hour session each week.*
Laboratory. *One 3-hour session each week. 2.5 units.* Prof. Burgess, Dr. Ellenbecker.
Intended for industrial hygiene and air pollution students. Covers the design and evaluation of local exhaust ventilation systems for the control of toxic air contaminants released into the workplace by industrial operations and processes.

ESP 254d. Environmental Control: Noise and Other Physical Hazards (One half of ENG SCI 270)
Lectures. *One 2-hour session each week.*
Laboratory. *Four 3-hour sessions. 2.5 units.* Dr. Ellenbecker, Dr. Cudworth, Mr. Cavanaugh (Consultant in Acoustics).
Introduces the fundamentals of sound and vibration generation, transmission and reception. Emphasizes the control of environmental noise and heat stress hazards in industrial workplaces. Basic measurement instrumentation and techniques will be introduced with practical exercises. The use of respiratory protection devices to control exposure to air contaminants will be discussed. Noise and heat stress hazard control methodology will be explored by means of lectures, demonstrations and field trips to laboratories and industrial plants.

ESP 261a,b. Aerosol Technology (ENG SCI 276)
Lectures. *Two 1-hour sessions each week.*
Laboratory. *One 2-hour session each week, "a" period; one 4-hour session each week, "b" period. 5 units.* Dr. Ellenbecker.
Covers the properties of suspended particles (dust, smoke, clouds) and the physical principles underlying their behavior. Topics include: particle motion due to gravitational, thermal and electrostatic forces; diffusion; impaction; coagulation; filtration; condensation and evaporation; optical properties; and sizing statistics. Laboratories cover optical and electron microscopy, sampling and mass concentration and particle size measurement.
Required for concentrators in industrial hygiene and air pollution control.

ESP 262c,d. Identification and Measurement of Air Contaminants (ENG SCI 273)
Lectures. *Two 1-hour sessions each week.*
Laboratory. *One 3-hour session each week. 5 units.* Dr. Smith, Members of the Department.
Emphasizes sampling and analytical methods for air contaminants plus related subjects. Included are: chemical and instrumental methods of air analysis, sampling statistics, biological agents, radioactive aerosol determinations, air pollution surveys, and industrial hygiene evaluations.
Required for concentrators in industrial hygiene, air pollution control, radiological health, and occupational safety programs.
Prereq. ESP 261a,b or permission of instructor.

ESP 263c,d. Air and Gas Cleaning (ENG SCI 279)
Lectures. *One 2-hour session each week.*
Laboratory. *One 4-hour session each week. 5 units.* Dr. Ellenbecker, Members of the Department.
Theory, selection, application, and testing of gas-cleaning devices. Particle collection by inertial, centrifugal, electrostatic, and other forces; gas absorption in liquids, adsorption on solids and incineration. Laboratory experiments illustrate principles involved.
Prereq. ESP 261a,b.

ESP 264b. Meteorological Aspects of Air Pollution (ENG SCI 275)
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Spengler.
Provides the student with a general understanding of the present status of local and long-range dispersion modeling. Also presents an evaluation of the meteorological factors associated with the transport, transformation, dispersion, and removal of air pollutants. Students will learn to recognize and define the parameters of elements in the atmosphere affecting pollutant dispersion and to calculate concentration fields downwind of pollutant sources.
Prereq. Knowledge of calculus.

ESP 265d. Community Air Pollution (ENG SCI 274)
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Spengler, Dr. First.
Air quality standards; health effects; damage to animals, plants and property; community and site surveys; the legal and enforcement aspects of air pollution control.
Prereq. ESP 251a, ESP 264b, ESP 262c,d (may be taken concurrently) or permission of the instructors.

ESP 270a. Basic Radiation Protection (One half of ENG SCI 278)
Lectures, demonstrations. *Two 2-hour sessions each week. 2.5 units.* Dr. Shapiro, Dr. Moeller.
Covers principles of radiation protection; interaction of ionizing particles with matter; the concept of radiation dose from external and internal sources; dose calculations, and radiation measurements.

ESP 271b. Occupational and Environmental Radiation Protection (One half of ENG SCI 278)
Lectures, demonstrations. *Two 2-hour sessions each week. 2.5 units.* Dr. Shapiro, Dr. Moeller.
Covers biological effects of radiation; radiation epidemiology; radiation protection standards and regulations, laboratory, industrial and environmental sources of radiation; and methods of environmental and occupational radiation protection.
Prereq. ESP 270a or equivalent.

ESP 273c,d. Concepts and Issues in Radiation Protection
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Moeller, Dr. Shapiro.
Involves detailed study of current handbooks and publications related to radiation protection. Areas covered include the regulation of radiation use and the evaluation and control of radiation hazards. Specific topics include: regulatory guides and standards, safety evaluation reports, evaluation of operating experience, risk assessment, and emergency planning.
A term report is required.
Ten or more students must be enrolled for course to be offered.
Prereq. ESP 270a or ESP 271b and permission of the instructors.

HPM-ESP 277c. Environmental Health Policy Analysis
Lectures, case discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Thomas, Dr. Roberts, Dr. Evans.
(Course described under Health Policy and Management.)

ESP-HPM 278b. Operations Management
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Evans, Dr. Shepard.
Emphasizes quantitative and descriptive methods for decision making in the areas of environmental and health sciences. Topics include: linear programming, statistical decision analysis, modeling, simulation, queuing, and analysis of error propagation. Uses micro (personal) computers.
Prereq. Calculus and statistics or permission of instructor.

ESP 300a,b,c,d. Tutorial Programs
Time and credit to be arranged.
Opportunities are provided for individual tutorial work for qualified students in the fields of respiratory biology, respiratory epidemiology, occupational medicine, industrial hygiene and ventilation, aerosol technology, radiological health, medical radiation physics, nuclear medicine, solid waste management, air pollution control, and environmental health management.

ESP 330e. Field Work
One-week period between fall and spring terms. 1 unit.
A week of supervised field observation is offered to students who may choose appropriate visits to medical or industrial hygiene departments of industries, airports and other agencies which have operations or research in the field of environmental health. Field work arrangements are generally made early in the fall term.

ESP 350. Research
Doctoral students may undertake theoretical, laboratory or field research under the direction of faculty members working in the following areas:

Air Pollution
Dr. First, Dr. Spengler.
Industrial gas cleaning, personal exposure monitoring, assessing air pollution potential from simple and complex pollution sources.

Community Air Pollution
Dr. Ferris, Dr. Speizer.
Health effects of air contaminants, epidemiology.

Environmental Health Management
Dr. Moeller, Dr. Hornig, Dr. Harrington, Dr. Evans.
Quantitative methods of environmental management, risk analysis, environmental standards, and criteria.

Industrial Hygiene
Prof. Burgess, Dr. Ellenbecker, Dr. Smith.
Monitoring exposures of occupational groups to toxic air contaminants, aerosol, physics, and ventilation; ergonomics applications to job design.

Inhalation Toxicology
Dr. Brain, Dr. Valberg.
Biological responses to inhaled particles and gases, deposition and clearance mechanisms.

Mathematical Physiology
Dr. Feldman, Dr. Butler.
Modeling of organ systems, experimental design.

Medical Physics
Dr. Bjarngard, Dr. Webster.
Dosimetry, instrumentation, image quality enhancement.

Occupational Health
Dr. Monson, Dr. Baker, Dr. Boden, Dr. Greaves, Dr. Robins.
Epidemiological and field studies, health hazard evaluation.

Radiological Health
Dr. Moeller, Dr. Shapiro.
Reduction of dose from sources of natural origin, radiation safety criteria and standards, control of radioactive contamination.

Respiratory Mechanics
Dr. Mead, Dr. Banzett, Dr. Loring, Dr. Drazen.
Physiological measurement of respiratory function.

Solid Wastes
Dr. First.
Incineration of solid wastes, including municipal, radioactive, biological, and laboratory materials.

Dr. Thomas Smith, Associate Professor of Industrial Hygiene, conducting on-the-job air quality tests as part of the occupational health studies.

The following courses, offered in the Harvard Faculties of Arts and Sciences and Government, and at the Massachusetts Institute of Technology, are open to qualified students from the School of Public Health and may be of interest to students of environmental health sciences.

Economics 1551. The Political Economy of Environmental Quality
Half course *(spring term). Tu., Th., at 12.* Dorfman.
Prereq. Social Analysis 10 or permission of instructor.

Engineering Sciences 162. Hydrologic Cycles
Half course *(fall term). Tu., Th., 10-11:30.* Fiering.
Prereq. Applied Mathematics 21b and one year of college-level physics.

Engineering Sciences 260. Engineering Systems for Environmental Control
To be given 1984-85; offered alternate years.
Half course *(spring term). M, W, F, at 10.* Harrington.
Prereq. Engineering Sciences 123 or permission of instructor.

Engineering Sciences 264. Chemical Aspects of Natural and Polluted Waters
Half course *(spring term). Tu., Th., 1-2:30.* Butler.
Prereq. Physical chemistry (e.g., Chemistry 10 or Engineering Sciences 161), and some experience with biology and geology.

M-113. Analytic Frameworks for Policy
Half course *(fall term). M., W., 9:30-11:00.* Zeckhauser.
Prereq. Microeconomic theory, optimization and decision analysis.

S-114m. Issues in Hazardous Waste Management
Modular course *(spring term). Hours to be arranged.* O'Hare.

M.I.T. 1.143J. Mathematical Optimization Techniques
Nine units *(fall term). Hours to be arranged.* D. H. Marks, H.N. Psaraftis.

M.I.T. 1.811J. Environmental Law: Pollution Control
Nine units *(fall term).* Ashford, Heaton.

M.I.T. 1.83. Organic Compounds in Aquatic Environments
Nine units *(fall term).* Gschwend.

M.I.T. 15.065. Decision Analysis
Nine units *(fall and spring terms). Hours to be arranged.* Kaufman.

M.I.T. 15.074. Mathematical Models and Policy Analysis
Nine units *(spring term). Tu., Th., 1-2:30.* Barnett.
Prereq. Statistics.

EPI 201a. Epidemiology in Public Health
Lectures and seminars. *Two 1-hour and one 2-hour sessions each week. 2.5 units.* Dr. MacMahon, Members of the Department.
Describes the place of epidemiology in public health. Sufficient introductory methods are presented to permit description of the applications of epidemiology in public health administration, disease control and public health research. Problems currently prominent in developing and in developed countries reviewed.

EPI 202b. Principles of Epidemiology I: Elements of Study Design and Data Analysis
Lectures. *Two 2-hour sessions each week. 2.5 units.* Members of the Department.
For students at the master's level who wish to acquire a familiarity with epidemiologic methods. The principles of study design and data analysis are presented with examples and exercises. The emphasis is on practical rather than theoretical issues. May serve as an introduction to more advanced study or as a final course for those desiring a working familiarity with epidemiologic methods.
Prereq. Knowledge of calculus and EPI 201a or permission of the instructor.

EPI 203c. Principles of Epidemiology II: Problem Conceptualization and Study Design
Not offered 1984-85.
Lectures. *Two 2-hour sessions each week. 4 units.* Members of the Department.
The course covers in a rigorous fashion the principles of epidemiologic study design. Intended for students preparing for independent research.
Prereq. EPI 202b or permission of the instructor.

EPI 204d. Principles of Epidemiology III: Data Analysis and Inference
Not offered 1984-85.
Lectures. *Two 2-hour sessions each week. 3 units.* Members of the Department.
The course covers in a rigorous fashion the principles of data analysis in epidemiologic research. Intended for students preparing for independent research.
Prereq. EPI 202b, and enrollment in a biostatistics course beyond BIO 201a,b or permission of the instructor.

EPI 205c,d. Practice of Epidemiology
Tutorials, seminars. *Tutorial sessions during "c" period; one 2-hour seminar each week during "d" period. 2.5 units.* Dr. Gutensohn, Dr. Hutchison, Dr. MacMahon.
The seminars consist of student presentations of plans for and analyses of epidemiologic data, with discussion by students and faculty. Preparatory work is done under tutorial arrangements with members of the faculty. For the analyses, the emphasis will be on conceptual issues and not on execution.
Prereq. EPI 202b and permission of the instructor. Enrollment limited to 16 students.

EPI 206c. Topics in the Theory of Epidemiology
Lectures. *One 2-hour session each week. 1.25 units.* Dr. Hutchison, Members of the Department.
For students who expect to conduct epidemiologic research. Consists of lectures on topics that are not part of the basic methodology covered in other courses in the Department. Topics include: sampling, factors affecting response, data handling, analysis of time-place clustering, cyclic variation, survival, and problems of distinguishing genetic and environmental components of a disease.
Prereq. EPI 201a and BIO 201a,b or equivalent.

EPI 211b,c. Epidemiology of Mental Disorders
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Klerman, Dr. Mollica, Dr. Murphy.
Surveys current trends in psychiatric epidemiology. Emphasis is on the development of standardized methods of case diagnosis and application to the epidemiologic study of specific mental disorders. Emphasis is given to affective disorders, schizophrenia and depression. Special attention focuses on sex differences, social class, risk factors, family studies, and genetics.
Prereq. EPI 201a or equivalent.

EPI 212d. Epidemiology of Chronic Disease: Cardiovascular and Respiratory Disease
Lectures. *One 2-hour session each week. 1.25 units.* Dr. Hutchison.
A review of the epidemiology of the chronic cardiovascular and respiratory diseases. Demographic distribution and time trends of these diseases are presented, and known risk factors are discussed.

EPI 213c. Epidemiology of Cancer
Lectures. *One 2-hour session each week. 1.25 units.* Dr. Gutensohn.
Reviews basic concepts and issues central to cancer epidemiology. Considers the descriptive epidemiology of cancer and discusses the implications of the biology of cancer for identification of risk factors. Examines the role of smoking,

Dr. Olli Miettinen, Professor of Epidemiology and Biostatistics.

radiation, hormones, nutrition, and viruses. Each student prepares a review of the epidemiology of a specific cancer site.
Prereq. EPI 201a.

EPI-ESP 215c,d. Environmental and Occupational Epidemiology
Lectures, seminars. *One 2-hour session each week. 2.5 units.* Dr. Monson, Dr. Robins.
This course has three objectives: (1) to review methods used in evaluating the health effects of physical and chemical agents in the environment, (2) to review available evidence on the health effects of such exposures, and (3) to consider policy questions raised by the scientific evidence. Includes lectures on methodology, seminars on the review and criticism of current literature and presentations by outside experts on the evaluation and impact of epidemiologic data.
Prereq. EPI 201a and BIO 201a,b.

NUT-EPI 216a,b. Nutritional Epidemiology
Lectures. *One 2-hour session each week. 2.5 units.* Dr. el Lozy, Dr. Willett, Mrs. Witschi.
(Course described under Nutrition.)

EPI 300a,b,c,d,e. Tutorial Programs
Time and credit to be arranged.
Students may participate in departmental research in close association with a staff member. Time and credit are to be arranged with the Chairman of the Department.

EPI 350. Research
In selecting topics for research in doctoral programs, students should consider the fields in which members of the Department are currently working. These include:

Neoplastic Disease
Dr. MacMahon, Dr. Gutensohn, Dr. Hutchison, Dr. Monson, Dr. Yen.

Effects of Contraceptive Agents
Dr. MacMahon.

Environmental Epidemiology
Dr. Monson.

Statistical Methods
Dr. Miettinen.

Nutritional Epidemiology
Dr. Willett.

Virus-associated Chronic Disease
Dr. Gutensohn.

Biochemical Epidemiology
Dr. MacMahon.

Psychiatric Epidemiology
Dr. Klerman.

HPM 100a,b. Economic Analysis
Lectures, seminars. *Three 2-hour sessions each week. 7.5 units.* Dr. Hemenway.
Designed to bring students to an intermediate-level understanding of economic theory. Emphasizes the uses and limitations of the microeconomic approach.
Required for students in the two-year Health Policy and Management Program and is the first course in the policy sequence.
May be taken for credit by students who previously have taken HPM 205a,b only with permission of the instructor.

HPM 205a,b. Economic Analysis for Public Health
Lectures, discussions. *Two 1½-hour sessions each week. 5 units.* Dr. Hemenway.
Provides an introduction to the basic principles of economics and economic analysis, particularly as they apply in the public health field. A systematic introduction to microeconomic theory includes the determinants of supply and demand, the theory of markets and the concept of economic efficiency. Specific topics in health care economics include demand for health care, insurance and the market for physician services.
May not be taken for credit by students enrolled in the two-year Health Policy and Management Program or by students who previously have taken HPM 100a,b.

HPM 207a,b. Economics of Health Policy
Lectures, discussions. *Two 1½-hour sessions each week. 5 units.* Dr. Hsiao.
Teaches students to use economic concepts and methods to analyze health policy issues. Applies analytical techniques to dissect complex policy problems and show what insights can be gained. Skills in using several analytical tools are developed, including economic modeling, systematic analysis, econometrics, and simulation. Health policy topics examined using these tools include national health insurance, reimbursement of hospitals and doctors, pro-competition, and facility and manpower planning. Course especially appropriate for students interested in doing policy analysis for the public or private sectors.
Prereq. One semester each of statistics and microeconomics.

HPM-BIO 219b, 219c, 219d. Statistical Methods for Health Policy and Management (Module I, II, III)
Lectures. *Three 2-hour sessions each week. 2.5 units each period.* Dr. Lavin, Dr. Anderson.
Introduces students to probability and statistics emphasizing their application in a variety of health policy and management contexts. Goals include establishing an awareness of basic statistical reasoning and recognition of common difficulties in application. The MINITAB package will be used throughout.
Module I(b): Topics include: distributions, data display, representative sampling, confidence intervals, hypothesis testing, testing means and proportions, p-value, power, study design and sample size determinations.
Module II(c): Topics include contingency tables, goodness of fit tests, rate adjustment and nonparametric methods.
Module III(d): Topics include: sample linear regression, correlation, prediction, multiple regression, discriminant analysis, forecasting and analysis of categorical data.

All three modules are required for students in the two-year Health Policy and Management program and in the management or policy curricula of the one-year Health Services Administration programs.
Sections will be graded separately.
May not be taken for credit by students who previously have taken BIO 201a,b.
If substituted for BIO 201a,b, all three modules must be taken.
Prereq. One college-level course in mathematics. Enrollment of students not in the Department of Health Policy and Management subject to approval of the instructors.

HPM 220a,b/220c,d. Administrative Systems
Lectures, seminars. *Three 2-hour sessions each week. 5 units each term.* Dr. Barrett, Members of the Department.
Examines issues related to managing health care organizations and develops skills in a variety of functional areas, including: organizational theory, institutional strategy, leadership, change and conflict, financial accounting and analysis, cost accounting, operations management, marketing, and management control systems. Classes rely principally on the case method of instruction.
Required for students in the two-year Health Policy and Management Program. HPM 220a,b may

be taken separately by other students, but only HPM 220a,b, 220c,d is an acceptable substitute for HPM 221a,b. HPM 220c,d may not be taken separately.
May be taken for credit by students who previously have taken HPM 221a,b.

HPM 221a,b. Managing Health Delivery Organizations
Case discussion and lectures. *Two 2-hour sessions each week plus four additional 2-hour sessions. 5 units.* Dr. Young, Dr. Sheldon.
An introduction to the management of health delivery organizations. Topics include: organizational issues, financial management, cost accounting, management control systems, and institutional strategy. Uses case method instruction, supplemented by topical readings, as a vehicle for analyzing management problems and evaluating alternative solutions. Relevant managerial concepts and theories are introduced.
Either HPM 221a,b or HPM 220a,b/220c,d is required for students in the M.P.H. program.
May not be taken for credit by students enrolled in the two-year Health Policy and Management Program or by students who previously have taken HPM 220a,b/220c,d.

HPM 234c. Financial Control in Health
Case studies. *Two 2-hour sessions each week. 2.5 units.* Dr. Young.
Discusses issues of cost-containment and financial control in health from both a managerial and public policy perspective. Topics include: cost comparisons, capital formation, the role of physicians, management control systems, and regulatory control. Examines current issues in financial control, develops a conceptual structure for approaching these issues, and examines how regulatory control systems might be designed to accommodate the unique characteristics of health care systems. Uses both cases and readings. Includes some international as well as U.S. materials.
Prereq. HPM 220a,b/220c,d or equivalent.

HPM 235d. Seminar on Hospital Cost Containment
Seminar. *One 3-hour session each week. 1.25 units.* Dr. Kasten.
Designed to be a state-of-the-art, holistic review and analysis of all factors involved in containing hospital costs: providers, intermediaries, regulators, planners, employers, unions, and consumers. First half of class session will be a discussion of relevant literature; second half will be a series of presentations/interactions with outside representatives of specific cost containment efforts.

HPM 236d. Management in the Health Care Industry (HBS 1344#-)
Lectures. *Two 1½-hour sessions each week. 2.5 units.* Dr. Herzlinger, Dr. Kane.
Focuses on the management issues in health care institutions including: those that deliver health care (hospitals and free standing facilities); that insure the provision of health care; that supply drugs, equipment, MIS services, and hospital supplies; that provide research in bio-technology; that provide capital; and that regulate the industry. Explores the strategic choices offered by the newly competitive structure of the industry and the managerial policies needed to execute these choices.
Prereq. HPM 220a,b,c,d or equivalent, by permission of the instructor.

HPM 238d. Managing Management Information Systems
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Young.
Examines issues relating to effective management of computer-based management information systems. Although some technological issues are addressed on occasion, the principal focus of the course is on topics of systems analysis and design, MIS strategies and organizational behavior, rather than technology. Uses case method instruction, supplemented by topical readings to focus on the role of the general manager in assuring the success of an organization's MIS.
Prereq. HPM 220 a,b/220c,d, HPM 221 a,b or equivalent.

HPM 239b. Financial Analysis of Hospitals
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Kane.
Provides the opportunity to develop advanced skills in financial accounting and analysis of financial reports. Covers fund accounting, accounting for inflation, analysis of financial statements, and funds flow. Cases draw on both hospitals and other non-profit organizations.
Prereq. HPM 220a,b/220c,d or equivalent.

HPM 240a. Toward an Agenda for Public Health
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Roberts, Guest Lecturers.
Provides an overview of the problems of setting priorities in public health. Examines the contribution of environmental, economic, social, and behavioral factors to the contemporary burden of illness. Analyzes changing definitions of health and disease and the roles of medicine and public health in dealing with illness. Explores the assumptions and implications of various

philosophical positions offered as a basis for resolving priority-setting questions.
Required for students in the Health Policy and Management Department.

HPM 241b. Health Care Delivery in the U.S.: History and Sociology
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Thomas, Mr. Marks.
Offers an introduction to contrasting sociological and historical accounts of the U.S. health care sector. Historical materials and contemporary case studies are used to analyze the roles of providers, patients and other political, cultural and social factors in determining the current objectives and institutional arrangements in this sector. The central role of physicians and "medical science" in health care is emphasized, and its implications for institutional reform explored.
Required for students in the two-year Health Policy and Management Program: General and Medical/Dental Tracks.
Prereq. HPM 240a.

HPM 242c,d. The Health Care Delivery System: Political and Economic Analysis
Lectures, discussions. *Two 2-hour sessions each week. 5 units.* Dr. Feldman, Dr. Hsiao.
Introduction to political analysis and health economics. Examines major health care delivery issues and the development and implementation of policies and programs designed to address them, using several frameworks, including that of economic and political analysis. Topics include: health care finance, health care access and utilization, the supply of and demand for medical care facilities, health care regulation, and competition and national health plans.
Required for students in the two-year Health Policy and Management Program: General and Medical/Dental Tracks.
Prereq. HPM 100a,b, HPM 205a,b or equivalent with permission of the instructor.

HPM 244c,d. Health Services Planning
Two 2-hour sessions each week. 5 units. Dr. J. Brown.
Introduces health planning concepts, methods, applications, and practice in the public and private sectors. Teaches and critically examines selected quantitative methods, including incremental cost analysis. Appraises the historical and future roles of health planners and planning in the United States. Designed for all students concerned with long-range resource allocation and its social effects in developed countries, as well as for students preparing for planning or strategic management positions in hospitals and government.
Prereq. Previous course work or background in cost accounting and health economics.

HPM 248a,b. Contemporary Issues in Health Policy
Not given 1984-85; offered alternate years.
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Feldman.
Examines from a variety of analytic perspectives three to four health policy issues of current political importance. Issues might include, for example, long-term care for the elderly, services for the mentally ill, the dissemination and regulation of medical technology, and/or the impact of "New Federalism" on health funding and health services. Analysis will focus on 1) alternative problem definitions and policy goals, 2) available evidence on policy impacts, and 3) economic, political and other criteria for choosing among various policy alternatives.
Prereq. HPM 240a, 241b, 242c,d or the equivalent introduction to economic and political analysis of the health care system.

HPM 250d. Policy Implementation
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Thomas.
Intended to help students think systematically about some of the reasons public programs succeed or fail. It assumes that the choice of appropriate and effective institutional arrangements for accomplishing policy goals is itself an important policy question. Examples are taken from a variety of policy areas.
Required for students in the two-year Health Policy and Management Program, and is the third course in the policy sequence.
Presumes knowledge of material presented in HPM 100a,b (or HPM 205a,b) and HPM-BIO 280c.

HPM-MCH 252a,b. Public Health Law and Human Rights
Lectures. *One 2-hour session each week. 3 units.* Dr. Mariner.
Entails an introduction to the U.S. legal system and a comprehensive examination of human rights as they bear upon health programs. Emphasis is on concepts of law governing public health programs and distinguishing between legal and moral rights. Among topics considered are rights to medical care and a healthy environment, equality, rights of medical patients, women, children, experimental subjects, and problems of balancing personal rights and community protection.
Enrollment limited. Auditing and convenience attendance not permitted.

HPM 253e. Government and Private Funding for Research and Health Care Programs
Lectures, discussions, workshops. *Time to be arranged. 1 unit.* Members of the Department.
To carry out research or develop needed health care programs, managers and policy analysts need to be able to obtain funding from federal, state and local government sources, and from foundations and corporations. This course aims to enable participants to demonstrate in a clear and concise proposal an understanding of the issues and facility with methodological design, and to explore potential sources of funding. Requirements for proper administration of funds are also discussed. Proposals are prepared and critiqued in the workshops.
Prereq. Exposure to research issues in health care or program development and permission of the instructor.
Students should enroll during the first week of b period (by November 20, 1984).

HPM 254c. Risk Management Programs, Quality Controls and Compensation Policies
Lectures. *Two 2-hour sessions each week. 2.5 units.* Prof. Curran.
Focuses upon the development, implementation and evaluation of risk management programs and legislative reforms in patient compensation plans. Attention will be given to medical and hospital malpractice experience, key legal decisions in the area and legislative reform movements setting up arbitration, screening panels, tort-law changes, no-fault mechanisms, etc. The inter-relationship of quality of care standards and quality assurance to malpractice vulnerability and risk management programs will be a primary focus of attention.
HPM 257b and HPM 258d advised, but not required.

HPM 255c. Reimbursement Systems
Seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Kane.
Examines issues related to the general theme of third-party reimbursement for health care institutions. The principal focus is on hospitals. Issues include: cost containment efforts, hospital perspectives and the role of incentives. Some specific systems are examined in detail in order to assess the feasibility of certain techniques and to address questions of overall reimbursement system design.
Introductory courses in financial and cost accounting recommended.

HPM 256c,d. Health Insurance Industry: Its Structure and Effects on Health Care
To be given 1984-85; offered alternate years.
Seminar. *One 2-hour session each week. 2.5 units.* Dr. Hsiao.
Examines the health insurance industry and how it affects patients, hospitals, physicians, and dentists. Provides students with an understanding of the industry's structure, the types of firms in this industry, their internal operations, product design, and reimbursement policies. Analyzes how the decisions of insurance firms affect access to health services, diffusion of medical technology, hospital costs, physician and dental fees, and competition in medical care.

HPM 257b. Physician Performance: Facilitators and Constraints
Seminars, case discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Palmer.
Examines circumstances and programs which facilitate or constrain quality of physician performance. Issues discussed include public expectations of physician performance, inherent task constraints, cost-tradeoffs, effect of practice setting and specialization, selection, education, licensure and specialty certification of physicians, malpractice and risk management, impaired physician programs, and utilization review programs.
Experience in medical care delivery an advantage, but not required.
Course is followed by the optional sequels HPM 254c and 258d.

HPM 258d. Evaluation of Quality of Health Care
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Palmer, Visiting Lecturers.
Examines issues in defining "quality in health care" and the choice of methods for assessing and improving quality of health care. Recent research is reviewed and operating programs, including the PSRO experience, are analyzed. Presentation includes case materials from quality of care evaluation programs in both hospital and ambulatory settings.
Additional sequel to HPM 254c and HPM 257b.

HPM 259c. Seminar on Physicians in Organizations: Management Issues
Seminars, lectures. *One 2-hour session each week. 1.25 units.* Dr. Sheldon.
Deals with the practical problems of doctors in health organizations—roles, relationships and behavior. Issues include managing—the industrialization of medicine; the M.D. as boss, employee and human being; measures of M.D. behavior; the clinical M.D. in different settings;

different types of M.D.; structural and interpersonal conflicts; and legal problems—from different managerial perspectives.
Prereq. Permission of the instructor. Class limited to 25. Preference given to students who have taken HPM 257b and to those who have a commitment to health care management.

HPM 262c,d. Health Planning and Policy for Developing Countries
Lectures, seminars. *Two 2-hour sessions each week.* Laboratory. *One 1-hour session each week* (optional). *5 units.* Dr. Shepard, Dr. Cash.
Deals with skills needed for health planning through lectures, problems, and case studies. Strong emphasis is placed on the economic analysis of health issues in developing countries. Concepts and techniques of cost-effectiveness analysis, recurrent cost analysis, monitoring of the delivery of health services are taught, applied to health care programs, and practiced with examples. Class is divided into groups which apply these techniques to analyze a planning problem and report their findings through presentations and a memorandum.
ID 209a or experience in developing countries is recommended, but not required. A background in economics is not required.

POP-HPM 263c. Case Studies in Design and Management of Population and Community Health Programs
Case discussions, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Berggren, Dr. Harkness. (Course described under Population Sciences.)

POP-HPM 264d. Case Studies in Comparative Design and Management of Population and Health Programs
Not offered 1984-85.
Case discussions, seminars. *Two 2-hour sessions each week. 2.5 units.* Members of the Department. (Course described under Population Sciences.)

HPM 266d. Program Implementation in Developing Countries
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Henn.
Provides an overview of the circumstances in developing countries which affect the implementation of health programs. Assists students in the adaptation and application of management techniques to deal with typical Third World health program implementation issues. Topics include: decentralized management, manpower development, community participation, financing, supervision and motivation, logistics, evaluation and redesign, information system development, and donor coordination.

HPM 267d. Political Economy of International Health
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Reich, Dr. Shaikh.
Examines critical health issues of developing countries in the larger international context of politics and economics. Explores how the relationships between developed countries and developing countries affect the management of health problems and policy. Students are introduced to two contrasting perspectives on development and health: modernization theory and dependency theory. Five case studies are discussed in class to illustrate the constraints and the opportunities created for health professions by the international complexities of domestic health problems.
Prereq. Permission of the instructor. Preference given to students with a previous background in international health or planning a career in international health.

HPM 270d. Issues in Mental Health Policy
Seminars, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Klerman, Guest Lecturers.
Reviews the historical development and current status of policy issues relevant to mental health and mental illness. Detailed attention will be given to the role of government and to identifying areas where further research is needed.

HPM 274a,b,c,d. Dental Care Administration Research Seminar (HDS DCA 222)
Lectures, Seminars. *One 3-hour session each week. 5.0 units.* Dr. Douglass.
The fall term will concentrate on the research methods of current national studies of the need, supply, demand, and cost of dental care. Policy documents of the A.D.A., I.O.M., O.T.A., Research Triangle Institute, RAND Corp., and the N.C.H.S. are studied. Research designs and data collection methods are reviewed. The spring term emphasizes the research work of faculty and students on relevant dental care policy and management subjects. A pass/fail or ordinal grade is based upon participation and the defense of a current research project.

HPM 275a,b. Dental Public Health Practice
Seminars. *One 2-hour session each week. 2.5 units.* Dr. Yacovone.
Provides in-depth training in the administration and planning of dental health programs. Subjects include: community needs, resources, surveying, fluoridation, prepayment, and program evaluation. Each student develops a program plan in a specific area of community dental needs and presents the plan to the class.

HPM 276c,d. Dentistry and Social Policy
Lectures, seminars. *One 2-hour session each week. 2.5 units.* Dr. Yacovone.
Investigates relationships between the social sciences and dentistry. Subjects include: the role of the social sciences in dentistry, psychosocial interaction of doctor and patient, client perceptions of dentistry, interpersonal relationships in group practice, and the sociopolitical influence of dentistry as an organization.

HPM-ESP 277c. Environmental Health Policy Analysis
Lectures, case discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Thomas, Dr. Roberts, Dr. Evans.
Using case studies, demonstrates the application of analytic skills to public policy design and implementation. The multidisciplinary approach emphasizes the technical uncertainties and the evaluative and institutional complexities surrounding environmental policy and management. Examples are drawn from air pollution, toxic and hazardous waste control.
Prereq. HPM 100 or equivalent, ESP 201a and 202b or equivalent. Required for students in the two-year Health Policy and Management Program: Environmental Track.

ESP-HPM 278b. Operations Management
Lectures. *Two 2-hour sessions each week. 2.5 units.* Dr. Shepard, Dr. Evans.
(Course described under Environmental Science and Physiology.)

HPM-BIO 280c. Decision Analysis for Health and Medical Practices (Public Policy S-176m)
Lectures, discussions. *Two 2-hour sessions each week. 2.5 units.* Dr. Weinstein.
Concerns the methods and applications of decision analysis, cost-effectiveness analysis and cost-benefit analysis in the evaluation of clinical procedures and health programs. Applications and limitations will be stressed. Examples used to illustrate techniques include: treatment decision for acute abdominal pain, coronary artery bypass surgery, resource allocation in hypertension, evaluation of immunization programs, and risk-benefit analysis for carcinogens.
Prereq. BIO 201a,b or HPM-BIO 219b, 219c (which may be taken concurrently) or equivalent introductory course in probability and statistics. Required for students in the two-year Health Policy and Management Program, and is the second course in the policy sequence.

HPM-BIO 281d. Seminar on Clinical Decision Analysis
Seminar. *Two 2-hour sessions each week. 2.5 units.* Dr. Fineberg, Dr. Barnes, Dr. Weinstein.
Intended to enhance the student's ability to conduct independent analyses of medical decisions. Didactic sessions will critically review published analyses and address selected topics, such as evaluation of diagnostic tests, utility assessment and use of computer aids. Presumes knowledge of principles of decision analysis.
Required for students in the two-year Health Policy and Management Program: Medical/Dental Track.
Prereq. HPM-BIO 280c. or permission of the instructor.

BIO-HPM 285a,b. Health Risk Assessment and Appraisal Lectures
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Bailar.
(Course described under Biostatistics.)

HPM 290a,b,c,d. Applied Research Seminar
Seminars. *One 2-hour session each week.*
Field work. *One day each week. 10 units.* Dr. J. Brown, Dr. Feldman, Members of the Department.
Teaches students to apply analytic and managerial methods to concrete problems. Each student defines and proposes solutions to an important problem confronting an institutional sponsor. Students learn research methods and problem-solving techniques during the 'a' period while developing project contracts with sponsors. In subsequent seminar meetings, students, sponsors and faculty advisers present and discuss study methods and findings. Students also meet individually with seminar faculty and designated faculty research advisers. Students prepare a "context/methods" paper during the first semester and a final project report due at the end of the year.
Required for students in the two-year Health Policy and Management Program.
Prereq. Completion of the first year of the Health Policy and Management Program.

HPM 295c,d. Doctoral Seminar on Research Methods
Seminar. *One 3-hour session each week. 5 units.* Dr. Roberts, Members of the Department.
Reviews the various research methods and approaches that relate to public health and explores how to design projects and choose methods appropriate to specific questions they wish to pursue. It is not intended to explore technical statistical issues, but rather places various clinical, experimental and observational strate-

gies for empirical research into a coherent context.
Prereq. Enrollment in the Health Policy and Management doctoral program and/or similar background and experience.

HPM 296a,b. Political and Economic Theory in Health
Seminar. *Two 2-hour sessions each week. 5 units.* Dr. Thomas, Mr. Marks.
Examines the uses of political and economic theory in explaining and assessing the operation of health care institutions and the quality of health policy. Contrasts the governing assumptions and reviews contemporary discussions of contractarian, utilitarian, institutionalist, and Marxist perspectives. Topics include: role of markets and political processes; the model of rational behavior; equity, rationality and efficiency in social choice; strategies for reform and social change.
Prereq. Enrollment in the Health Policy and Management doctoral program and/or course work in microeconomics.

HPM 300a,b,c,d,e. Tutorials
Time and credit to be arranged.
Students may make individual arrangements to do work under the guidance of a member of the Department. This work may include readings or special projects.

HPM 330e, 330f. Field Work
Time and credit to be arranged.
Students are assigned to work on special projects such as group surveys, other types of field projects or observation of and limited participation in the work of health agencies. Field assignments are made on an individual basis to meet the needs of each student insofar as possible. Work in the field is coordinated with courses in the Department and is offered through the Community Health Improvement Program.

HPM 350. Research
Doctoral candidates may register for HPM 350 to undertake individual study and research.

Attention is directed to courses described under Interdepartmental Courses.

The following courses, offered by the Faculties of Arts and Sciences and Government, are among those that may be of particular interest to students of health policy and management. They are open to qualified students from the School of Public Health.

Historical Study B-51. Disease and History: The United States and the Conquest of the "Great White Plague," 1842-1952 7173
Half course *(spring term). M, W, F, at 1.* Rosenkrantz.
The social and conceptual history of "consumption," its transformation into tuberculosis, and its conquest through medical research and social policy. The course concentrates on the period 1842 (the first analytic registration of mortality in the United States) through 1882 when the tubercle bacillus was identified to its ultimate control in the 20th century.

History of Sciences 145r. Social Sciences and Medicine in the United States 7071
Half course *(fall term). W, 4-6.* Rosenkrantz.
An examination of the lives of selected social scientists and physicians whose work demonstrates the relations between the medical sciences and "social problems" at the turn of the century. Students are expected to research and write a biographical essay illuminating an aspect of the history of medicine.

History of Sciences 292r. Readings in the History of Epidemiology 4296
Half course *(spring term) W, 4-6.* Brandt, Rosenkrantz.
Focuses on the history of the classic texts in modern epidemiology as they have reflected changing views of the etiology of disease. Emphasis is on the analysis of primary documents and their impact on medicine and public health.

Statistics 100. Introduction to Quantitative Methods
Half course *(fall term). M, W, F, at 9.* Mosteller.
Introduces students to the design and analysis of empirical studies. Elements of sample surveys, experimental design and observational studies, descriptive and summary statistics for both measured and counted variables, tests of hypotheses including t and F tests, nonparametric procedures, contingency tables, regression with one or more predictors, correlation, and analysis of variance.

S-171. Issues in Health Policy
Half course *(spring term). M, W, 12:30-2:00.* Blumenthal, Feldman.
Examination of the ultimate goals of health policy and alternative means for achieving those goals. The current performance of the health care system is discussed, with special emphasis on problems related to the health of our population, the growing cost of health services, and the equity of our health care system.

MCH 200a. Growth and Development I
Lectures, self-instructional material. *Two 2-hour seminars/lectures weekly. 2.5 units.* Dr. Tanner, Dr. Valadian.
Instruction in physical growth, development, maturation, and aging is presented in programmed, self-instructional material, and by weekly lectures. Covers topics necessary for the advanced study of growth and development, but also provides an understanding of assets and needs which constitute a basis for health services. Designed for MCH students who do not have a strong background in physical development, but may also be taken by health providers who wish to refresh their knowledge.

MCH 201b. Growth and Development II: Advanced Seminar
Seminars. *One 2-hour session each week. 1.25 units.* Dr. Valadian.
Describes and integrates the characteristics of human growth and physical development which occur during the selected life stages from conception to maturation. Intended for students with special interest in human development. Considers implication of child growth and development of these periods for health services and further research.
Prereq. MCH 200a or permission of the instructor.

MCH 202c. Growth and Development III: Factors Affecting Growth and Development
Lectures, seminars. *One 2-hour session each week. 1.25 units.* Dr. Valadian.
Explores definable influences that act on the course of physical growth and development from conception to maturity. Emphasis is placed on understanding the nature of the factor and its direct effects, as well as on how factors interrelate to produce some characteristics of mature individuals. This course also considers implications of factors for planning and providing health services and for future research.

MCH 203e. Primary Maternal and Child Health Care
Seminars, lectures, field visits. *Full-day sessions. 1.25 units.* Dr. Gardner.
Introduces the student to principles of organization and administration of primary health care services for mothers and children. Concepts of primary care, neighborhood health centers and quality assurance are presented. Seminars focus on the issues and problems presented in the field visits. The community programs selected are diverse, including neighborhood health centers, private practice, hospital primary care, HMO and/or university health care.
Must register by October 15; enrollment limited to 12 students.

MCH 204a,b. Content of Maternal and Child Health Programs
Seminars. *Two 2-hour sessions each week. 5 units.* Dr. Gardner.
Components of health care programs for mothers and children are discussed as they vary to meet changing needs resulting from growth and maturational processes. Health programs appropriate to maternity, early and late childhood, adolescence, and youth are presented in terms of the multidisciplinary and interdisciplinary action they require. Also included are the historical background and the relationship of maternal and child health programs to social, mental health, education, and other systems; the course includes a discussion of factors which shape current and future maternal and child health policies and services.

MCH 205c,d. Planning, Implementation and Evaluation of Maternal and Child Health Programs
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Valadian, Members of the Department, Guest Lecturers.
Considers the organization and administration of national, state and local health programs for mothers, infants, children, and adolescents, and services for children with handicapping conditions. Selected issues examined, such as developmental disorders, Sudden Infant Death Syndrome, day care, school health. Emphasis placed on financing, planning, implementing, and evaluating MCH programs in the U.S.

MCH 206c,d. Maternal and Child Health in Developing Countries
Seminars. *One 2-hour session each week. 2.5 units.* Dr. Valadian.
Parallels MCH 205c,d. Emphasizes factors which shape MCH programs in rapidly changing social and cultural environments, particularly the interactions between health, nutrition and poverty. Studies selected programs by age periods from various areas of the world and the processes of planning, financing, implementing, and evaluating such programs in relation to other sectors. Individual or small group case study projects are required.

MCH-NUT 207c,d. Nutrition in Child Growth and Development
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Dwyer.
Principles and practical problems encountered in the nutritional aspects of child growth and development are examined. Lectures on general principles are designed to help students base their judgments on scientific evidence. Discussions deal with a variety of nutrition case studies and simulations illustrative of problems in both developing and highly industrialized countries.

MCH 208d. Rural Health Services
Seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Hayes.
Lectures and discussions focus on the special problems of rural communities affecting MCH services delivery, cultural characteristics, resources available, and innovative approaches to problems, with selected examples in rural areas. Emphasis placed on doing needs/demands assessments or community diagnosis which structure planning for the health needs in isolated communities. Topics include transportation problems, environmental health hazards and rural health concerns in developing countries.

MCH 209c. Services for Children with Handicaps
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Crocker.
Provides a review of the handicapping conditions of childhood: mental retardation, physical disability, sensory and communication disorders, and emotional disturbance, as these affect development, adjustment and family resources. The service system will be analyzed with regard to health care, developmental support, education, residential options, and prevention.

MCH 210b. An Introduction to Personality and Cognitive Development
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Walker.
The basic principles of child growth and development in the cognitive and the psychosocial domains are examined in this introductory course. Special emphasis placed on understanding the theories and research of Piaget, Freud, Erikson, and others, as well as the implications of these contributions to the planning and implementation of medical and/or related social and educational services for children and youth.

MCH 211c. Health Care of Women
Not offered 1984-85.
Seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Gardner.
Considers critical issues of health care and the common problems of women, including the changing role of women in contemporary United States society. These health problems are addressed in terms of their epidemiology and the impact of technology on their detection and treatment viewed from biological, medical, behavioral, and legal perspectives.

MCH 212d. Childhood Mental Disorders: Public Health Perspectives
Lectures, seminars. *Two 2-hour sessions per week. 2.5 units.* Dr. Deykin, Dr. Rauh.
Examines the occurrence and known risk factors of selected mental disorders of childhood and adolescence, including autism, depression, hyperactivity, and anorexia. Emphasis is on the methodologic issues of case definition, disorder classification, current diagnostic and screening instruments, and on the advantages/disadvantages of available data sources. Readings will include studies selected to illustrate methodologic options and usefulness for public health policy.

MCH 213d. Obstetric Epidemiology
Lectures, seminars. *One 2-hour session each week. 1.25 units.* Dr. Sachs.
Tackles controversial issues in maternal health through techniques in epidemiology applied to obstetrics. Focuses on maternal mortality, obstetric and gynecologic morbidity, evaluation of obstetric health care, populations at risk, such as pregnancies in women over 35. Examines the epidemiology of prematurity and current issues such as breast feeding, home births, Cesarian Sections, and fetal monitoring.

MCH 214a,b. The Elderly Person in the Health Care System (HMS Geriatrics 702)
One 2-hour session each week. 2.5 units. Dr. Laurence Branch (Assistant Professor of Social Medicine and Health Policy, Harvard Medical School).
Uses a variety of public health perspectives to analyze the health needs of the elderly and services to meet them. Topics include: demographic background of the "graying" of America, normal and pathological aging processes, epidemiology of geriatric illness, design and administration of present service programs for elders, and consideration of alternative forms of long-term care.

MCH 222c. Social Services for Children, Adolescents and Families
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Deykin.
Presents the crucial role of social services in maintaining and promoting the health of children and their families. Beginning with a historical overview of social services in the U.S., the course content examines current political trends which structure the content and delivery of social services, drawing comparisons with those in other countries. The social and psychological determinants of the need for social services will focus on events of public health relevance, including terminal illness in childhood, adoption/foster care, family violence, substance abuse, and pregnancy in adolescence.

HPM-MCH 252a,b. Public Health Law and Human Rights
Lectures. *One 2-hour session each week. 3 units.* Dr. Mariner.
(Course described under Health Policy and Management.)

MCH 300a,b,c,d. Tutorials
Time and credit to be arranged.
Students at the master's level may arrange to work individually or in small groups under the guidance of a faculty member. The work may include participation in departmental research, specialized readings, field projects in a local or state health agency, or small studies to examine more in-depth topics introduced in various courses such as planning and evaluation of MCH services for children with handicapping conditions.

Tutorials will be offered depending on students' interests and will be limited by the amount of faculty time that is available. Arrangements must be made with individual faculty members.

MCH 330. Field Study
Field study will be arranged on an individual basis to meet the special needs of each student insofar as possible. A group field study to Mississippi is offered prior to the course MCH 208.

Additional Field Study
Students who lack sufficient previous experience are encouraged to undertake a period of field study before registration or after completion of the academic year in a program arranged by the staff of the Department. No credit is allowed for such field study.

MCH 350. Research
Doctoral students are required to undertake research in maternal and child health.

NUT 201a,b. Principles of Nutrition
Lectures. *Two 2-hour sessions each week. 5 units.* Dr. el Lozy.
An in-depth study of nutrients in relation to human health. The essential nutrients, their requirements and their functions in the organism will be covered, as well as the important health issues related to nutritional deficiencies and excesses in industrialized countries. Provides the foundation for other courses in nutrition.

NUT 202c. Nutrition Policy and Management—United States
Two 1½-hour sessions each week. 2.5 units. Members of the Department.
Deals with the formation of food and nutrition policies and the operation of nutrition intervention programs aimed at the major nutritional problems in the United States. Case study approach applied to evaluate the major U.S. nutrition programs and policy issues (school lunch feeding, WIC program, nutrition and aging, and development of a national nutrition policy). Local, state and national perspectives will be explored.
Prereq. NUT 201a,b or permission of the instructor.

NUT 203d. Nutrition Policy and Management—Developing Countries
Two 1½-hour sessions each week. 2.5 units. Dr. Herrera-Acena, Members of the Department.
Deals with the problem of malnutrition in developing countries. Using case study approach, the course will examine the design, planning and implementation of food and nutrition policies as well as the design and management of specific nutrition programs. The nutrition programs which will be examined include fortification, nutrition education, supplementary feeding, consumer subsidies, and agriculture.
Prereq. NUT 201a,b or NUT 210a,b or permission of the instructor.

NUT 204a,b/204c,d. Departmental Seminars
Seminars. *Two 1-hour sessions each week. 2.5 units each term.* Dr. Owen, Members of the Department.
Students participate in and present seminars reviewing current research and publications related to nutrition in addition to attending advanced seminars presented by faculty and guest speakers. Beginning students learn skills required for oral presentations. Topics include both basic research and applied areas of nutrition.

NUT 205c,d. Biochemistry and Physiology of Nutrition
Lectures. *Two 2-hour sessions each week. 5 units.* Dr. Franceschi, Members of the Department.
The biochemistry and physiology of carbohydrates, fat, protein, vitamins, and minerals are integrated from the nutritional perspective. Course provides an in-depth analysis for students with a major interest in nutritional biochemistry.
Prereq. Course in biochemistry and permission of the instructors.

MCH-NUT 207c,d. Nutrition in Child Growth and Development
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Dwyer.
(Course described under Maternal and Child Health.)

NUT 208c,d. Nutritional Aspects of Human Disease
Lectures, case presentations, discussions. *One 2-hour session each week. 2.5 units.* Dr. Herrera-Acena, Dr. el Lozy, Mrs. Witschi.
Reviews the role of diet in the causation and management of clinical obesity, diabetes mellitus, coronary artery disease, anemia, liver disease, alcoholism, gastrointestinal disorders, and renal disease. Early detection and prevention of these nutrition-related disorders considered.

NUT 209a,b. Food Science and Nutrition
Lectures, discussions. *Two 1-hour sessions each week. 2.5 units.* Mrs. Witschi, Dr. Samonds, Members of the Department.
Deals with nutrition in terms of the foods which supply mankind's nutrient needs, their composition and physical properties, and the positive and negative effects on nutrient qualities of food of genetic manipulation, agricultural practice, processing, storage, and cooking. The historical development of food technology, including methods of preservation and sanitation, is related to current methods employed in both developing and industrialized countries.

NUT 210a,b. Nutrition Problems of Less-Developed Countries
Lectures, discussions. *One 2-hour session each week. 2.5 units.* Dr. Herrera-Acena.
The nutrition problems of less-developed countries are discussed in the context of basic human needs. The ecology and the biological and behavioral consequences of malnutrition are reviewed

in detail. Special emphasis on issues in human biology relevant to the formulation of nutrition policy and programs.

NUT 214a,b/214c,d. Research Techniques in Nutritional Biochemistry
Lectures. *One 1-hour session each week.*
Laboratory. *Fifteen hours minimum each week. 5 units each term.* Dr. Geyer, Members of the Program in Nutritional Biochemistry.
Students have the opportunity to rotate through the laboratories (one each period) of faculty members in the Nutritional Biochemistry Program in order to learn current techniques applied to nutritional, cellular and biochemical research. Weekly lectures will emphasize the theory behind the instrumentation utilized in the laboratory. Oral and written presentations of research accomplished by the student to the Nutrition Faculty as required. Generally limited to students in the Nutrition Department.

NUT-EPI 216a,b. Nutritional Epidemiology
Lectures. *One 2-hour session each week. 2.5 units.* Dr. el Lozy, Dr. Willett, Mrs. Witschi.
Reviews methods for assessing dietary intakes of populations and individuals. Students will gain experience in the actual collection, analysis (including conversion to nutrients by computer) and interpretation of dietary intakes. Case studies follow, involving specific diet disease relationships integrating information from international studies, secular trends, clinical trials, analytical epidemiology, and animal experiments.
Prereq. BIO 201a,b, EPI 201a and permission of the instructor for students who have not taken a course in nutrition.

NUT 217d. Neurochemical and Dietary Factors in Cardiovascular Disease
Lectures. *Two 1½-hour sessions each week. 2.5 units.* Dr. Verrier.
The problem of cardiovascular disease is discussed in the context of contemporary research in nutrituion, neuropharmacology and applied physiology. The course will be based on material from textbooks and original papers. Emphasis will be placed on the potential clinical applications of this multidisciplinary approach.
Prereq. Courses in biochemistry and physiology and permission of the instructor.

NUT 300a,b,c,d,e. Tutorial Programs
Time and credit to be arranged.
Individual work under direction may be arranged. This can include laboratory studies, projects in applied nutrition or library research.

NUT 351-368. Research
Time and credit to be arranged.
Facilities are available for doctoral students to do advanced work in nutrition along the lines of fundamental or applied research as related to public health and medicine. Areas currently receiving intensive and comprehensive study in the Department are as follows:

351 Dr. Geyer.
Effects of growth factors and hormones on the metabolism of human cells in culture; nutrition and metabolism of isolated organs; complete blood replacement *in vivo* with artificial preparations.

352 Dr. Goldman.
The metabolism of food constituents and drugs, particularly as carried out by intestinal bacteria. Emphasis given to areas of metabolism that may help to understand a compound's biological activity.

353 Dr. Lown.
Coronary artery disease; etiology of sudden death; derangements of the heart beat; exercise physiology; electrolyte metabolism.

356 Dr. Antoniades.
Regulation of cell growth by hormonal growth factors derived from human serum or platelets; platelet-derived growth factor and atherogenesis; mechanisms of hormone transport and regulation.

358 Dr. Herrera-Acena.
The role of nutrition and other environmental factors in the etiology and management of diabetes mellitus; the relationship of malnutrition to physical and cognitive development.

359 Dr. el Lozy.
The quantitation of malnutrition in children in developing countries on the basis of anthropometric measurements; studies of mathematical models of growth; application of these models to the study of growth in chronic diseases of childhood (diabetes, cystic fibrosis, etc.).

362 Dr. Verrier.
Influence of neural factors, psychologic conditioning and myocardial ischemia on susceptibility to ventricular arrhythmias and sudden death.

363 Mrs. Witschi.
Computer-based interactive dietary history, analysis and counseling programs.

364 Dr. Reinhold.
Structural characterization of glycoconjugates on biosurfaces by high performance liquid chromatography, gas chromatography and mass spectrometry.

366 Dr. Franceschi.
Control of intestinal calcium absorption by 1,25-dihydroxyvitamin D_3, a steroid hormone. Regulation of gene expression by steroid hormone receptors. Mechanism of intestinal calcium transport.

368 Dr. Owen.
Hormonal regulation of nutrient uptake and membrane function in human cells. Mechanism of action of growth factors. Regulation of amino acid transport and protein synthesis.

Admission limited and subject to approval of the instructor.

POP 191a,b. The Spatial Aspects of Societies (Sociology 191)
Not offered 1984-85.
Lectures. *Two 1-hour sessions each week. 5 units.* Dr. Alonso.
Stresses the interaction of societies and their geography, focusing primarily on the historic and current development of the United States. Consideration is given to technology, institutions, ideology, health, the economy, and other factors influencing the growth and shape of cities, their relations to each other and to rural areas.

POP 200a,b. Introduction to Population Sciences
Lectures. *One 2-hour session each week. 2.5 units.* Professor Bell, Members of the Department.
Reviews the basic elements of population change—fertility, mortality and migration—and their interaction with social, cultural and economic characteristics of societies at each stage of the demographic transition, i.e., for both developed and developing countries. Introduces basic demographic concepts and methods, including age-sex pyramids, life tables and demographic rates.

POP 201a,b. Introductory Seminar on Population Sciences
Seminars. *One 2-hour session each week. 2.5 units.* Dr. Potter, Dr. Hausman.
Supplements the introduction to population sciences presented in POP 200a,b. Most students will be concurrently enrolled in 200a,b. Through in-depth study of two or three defined human communities, students learn how to trace immediate and underlying causes of rates of birth, death and migration as they have changed through the past one or two centuries, with inferences for the goals of public health and population policies and programs. Short papers are required.

POP 202c,d. Student Project Design Seminar
Seminars. *One 2-hour session each week. 2.5 units.* Dr. Larson, Dr. Harkness.
Oriented toward health and population problems of communities. Each student selects a community and an appropriate health or population problem. He/she presents a critical survey of the relevant literature and a project design, to amplify understanding of the relative frequency of the selected problem in relation to other health or population problems of the community, and to increase or test the available knowledge of causes of the problem.
Prereq. Introductions to biostatistics, epidemiology and (preferably) population sciences. Enrollment after interview with the instructor.

POP 204c,d. Biological Basis for Fertility Control
Lectures. *Three 1-hour sessions each week. 5 units.* Dr. Salhanick, Members of the Department.
Presents the fundamental physiology and biochemistry related to known and potential methods of family planning. Topics include: the biosynthesis, secretion, effects and modes of action of the gonadal, gonadotropic and hypothalamic hormones and the relationship of the natural steroid hormones to synthetic analogues is also discussed. A short paper or presentation may be required.
Prereq. Appropriate science background or permission of the instructor.

POP 205a,b. Introduction to Demographic Analysis
Lectures, discussions. *Two 2-hour sessions each week. 5 units.* Dr. Potter.
Reviews fundamentals of the measurement and analysis of mortality, nuptiality, fertility, migration, population growth, and age structure. Topics include: sources of demographic data, demographic rates, cohorts and periods, model life tables and models of nuptiality and fertility, stable population theory, and population projections. Students will have the opportunity to analyze the demographic future of selected countries such as the United States, Mexico and China.

POP 206c,d. Demographic Methods for Developing Countries
Seminars. *Two 2-hour sessions each week. 5 units.* Dr. Larson.
Reviews methods for estimation and analysis of mortality and fertility rates from limited and faulty data, obtained from censuses, surveys, maternity histories, and vital registration systems. Topics include: estimation of infant, child and adult mortality; age- and duration-specific fertility rates; determinants of birth intervals; and evaluation of family planning programs. Students participate in discussions of recent literature and statistical analyses of levels and trends in demographic rates.
Prereq. An introductory course in population.

POP 209a,b. Foundations of Agricultural Sciences (Biology 195) (*Given at HSPH*)
Lectures, seminars. *Two 1½-hour sessions each week. 5 units.* Dr. Levins.
Examines patterns of world food production as they develop from the interaction of social and biological systems: evolution of agro-ecosystems, principles of plant growth and productivity, pests and diseases, ecology of farming systems, consequences of technical choices, issues of agricultural change, and research strategies.
Prereq. Course in biology or permission of the instructor.

POP 212c,d. Economics of Population Growth (Economics 1263)
Lectures, discussions. *Two 1-hour sessions each week with a third hour at the discretion of the instructor. 5 units.* Dr. Leibenstein, Dr. Potter.
Emphasis on effects of population growth on problems of underdeveloped countries. The welfare economics of population control, relations between population growth and resources, age-structure effects on demographic and economic variables, economic determinants of fertility change, and assessing the population obstacle to economic growth.
Prereq. POP 200a,b and HPM 205,a,b or equivalent.
Note: This course given on Cambridge Campus.

POP 214c,d. The Biological Determinants of Fecundity, Environmental Factors and Population Growth
Lectures. *One 2-hour session each week. 2.5 units.* Dr. Frisch.
Examines the direct effect of environmental factors such as nutrition and physical activity on female and male reproductive ability throughout the reproductive span. Topics include: adolescent growth, age of menarche, effects of exercise on the menstrual cycle, male maturation, age-specific fertility; pregnancy wastage, lactational amenorrhea and the birth interval, and age of menopause. Also included are the basic physiology and endocrinology of human reproduction, the history of birth control and the interaction of biological factors and social customs affecting population growth.

POP 216c,d. Comparative Analysis of Public Policies in Developing Countries (Government 2110)
Lectures, seminars, workshops. *One 2-hour session each week. 5 units.* Dr. John D. Montgomery (Professor of Public Administration, John F. Kennedy School of Government).
Examines patterns of policy making across cultures and issue areas, including interactions between policies and social contexts. Surveys Third World policies for dealing with such problems as population (fertility and migration); malnutrition; land reform; and management of large-scale irrigation systems. Applies the policy sciences approach to the formulation and implementation of large-scale programs of public intervention in social processes.

POP 217b. Introduction to Community Diagnosis of Birth and Death Rates in Developing Countries
Lectures, discussions. *One 2-hour session each week. 1.25 units.* Dr. G. Berggren.
Helps students distinguish within communities those kinds of persons at high risk of serious illness, death and unwanted births. It uses data from studies at national and local levels to trace underlying causes of these events as the basis for designing feasible, effective and simple preventive measures. Provides foundation for POP 202c,d and for other health and population courses considering policies and programs.
Prereq. Introductory courses in biostatistics, epidemiology and (preferably) population sciences.

POP 220d. Human Ecology
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Levins.
Provides a broad overview of the human ecosystem as it emerges out of, but is different from, pre-human ecology. For each area of ecology, general principles will first be considered, followed by examples from different human societies. Also considers the role of knowledge and conscious planning as an aspect of human ecology and examines approaches toward the solution of ecological problems.
Prereq. Assumes basic knowledge of biology.

POP-HPM 263c. Case Studies in Design and Management of Population and Community Health Programs
Case discussions, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Berggren, Dr. Harkness.
A managerial perspective on the problems of developing and implementing population and primary health care programs in Third World nations. Problems are examined from the level of managers of clinics, community and national programs. Topics covered primarily through case studies based on family planning and primary health care programs, particularly at the community and regional levels.

POP-HPM 264d. Case Studies in Comparative Design and Management of Population and Health Programs
Not offered 1984-85.
Case discussions, seminars. *Two 2-hour sessions each week. 2.5 units.* Dr. Wyon, Members of the Department.
Addresses the same problems as POP-HPM 263c, with emphasis on the management of population, primary health care and social-economic development programs in a broad range of national contexts.
Students may take POP-HPM 263c and POP-HPM 264d separately or together.

POP 300a,b,c,d. Tutorial Programs
Time and credit to be arranged.
Students at the master's level may make arrangements for tutorial work and special reading on topics related to population problems. There may be an opportunity to consider the design of studies, programs or analysis of data.

POP 330e,330f. Field Studies
During the week between the fall and spring terms *or* the week between the two halves of the spring term. Students should sign up for one choice only; the week chosen will be at the discretion of the tour directors. Organized by Haitian graduates of the School and cosponsored by the Department of Population Sciences and the Office of International Health. Students must sign up for the course with the Department by October 15. The estimated 1984-85 cost is $1,400, which includes air fare, accommodations, honorarium, and faculty time. Partial financing of the course is the responsibility of the student and should be arranged as early as possible in the academic year.
Dr. G. Berggren, Dr. Cash.

Field Trip to Haiti
The objective of this field study is to provide exposure to the urban, rural and development problems of a developing country. Students visit the homes of rural farmers to observe the living conditions of these families and their accessibility to health care facilities and programs. Students also see rural health centers, health surveillance teams, nutrition programs, and the headquarters of various health programs. What has been observed, how it relates to data previously collected and what programs can be developed to improve the conditions are then discussed with the group's leaders and with local health planners. Students are required to give a talk to Haitian colleagues and to write a report. Enrollment limited to 10 and subject to approval of the instructors.

POP 350-355. Research
Time and credit to be arranged.
Candidates for doctoral degrees may undertake research in the Department or may integrate research in population sciences with a doctoral program in another department or at the Center for Population Studies.
Members of the Department and of the Center for Population Studies are currently engaged in research in the following areas:

350 *Field studies and programs*
Dr. Wyon, Dr. Guerrero, Dr. G. Berggren.

351 *Biomedicine and reproductive physiology*
Dr. Salhanick.

352 *Demography*
Dr. Potter.

353 *Population ethics*
Dr. Dyck.

355 *Complex systems*
Dr. Levins.

356 *Migration and Development*
Dr. Stark.

The following courses, offered by other faculties of Harvard University, are among those that may be of particular interest to students of population sciences. They are open to qualified students from the School of Public Health.

Ethics 2965. Seminar: Ethical Aspects of Population Policy
Half course (*spring term*). *Th., 10:30-12:30.* Dyck.
A critical analysis of past and contemporary questions concerning human rights, with particular attention to questions of pro-creative rights and fertility-influencing policies.

Sociology 251. Seminar: Social Policy and Population Issues in the Developed Countries
Not offered 1984-85.
Half course (*spring term*). *M., 2-4.* Alonso.
A broad range of issues in the developed countries, including education, health, housing, social security, status of women, labor policy, and racial and group prejudice, are affected by declining fertility, growing up of the baby boom generation and international migration. Stresses social processes involved and the policy responses proposed and tried out. (Offered in the FAS.)

TOX 204a. Introduction to Principles of Toxicology
Lectures, seminars. *Two 2-hour sessions each week. 2.5 units.* Credit will be given only upon successful completion of this course *and* ESP 233c. Dr. Toscano, Members of the Laboratory.
This course is a prerequisite for ESP 233c Industrial Toxicology and may not be taken in isolation. No credit will be offered until satisfactory completion of ESP 233c. The course content is identical to the first half of TOX 205a,b Principles of Toxicology.
Prereq. Organic chemistry and mammalian physiology.

TOX 205a,b. Principles of Toxicology (HMS Pharm. 713., FAS Pharm. 218)
Lectures, seminars. *Two 2-hour sessions each week. 5 units.* Dr. Toscano, Members of the Laboratory.
Emphasis placed on mechanisms of injury resulting from exposure to environmental chemicals at the molecular, cellular, organ and organismal levels. Methods used to detect, evaluate, analyze, and alleviate the toxic effects of chemicals are discussed.
Prereq. Organic chemistry and mammalian physiology.

TOX 208a,b/209c,d. Seminar in Toxicology
Seminars. *One 1-hour session each week. 1 unit each term.* Dr. Rice, Members of the Laboratory.
Seminars, journal clubs and discussions of topics in basic research and the current literature in toxicology.
Prereq. Background in toxicology or related fields and permission of the instructor.

TOX 210a,b/211c,d. Advanced Toxicology
Lectures, discussions, seminars. *One 2-hour session each week.*
Laboratory. *To be arranged. 5 units.* Dr. Rice, Members of the Laboratory.
Examines experimental methods of research in toxicology. Includes individual laboratory work.
Prereq. TOX 205a,b or equivalent and permission of the instructor.

TOX 300a,b,c,d. Tutorial Programs
Time and credit to be arranged.
Dr. Tashjian, Members of the Laboratory.
Opportunities are provided for tutorial work in molecular, cellular, biochemical, and environmental toxicology.
Prereq. Permission of the instructor.

TOX 350. Research
Doctoral candidates may undertake laboratory research in toxicology under the direction of a faculty member.
Drs. Tashjian, Eisenstadt, Ofner, Rice, Samson, Schonbrunn, and Toscano.

Nita Bikkal, research assistant in the Laboratory of Toxicology, changing the media of cell stock.

TPH 201a. Ecology, Epidemiology and Control of Important Parasitic Diseases of Developing Areas
Lectures, seminars, demonstrations. *Two 1-hour sessions and one 2-hour session each week. 3 units.* Dr. Hoff, Members of the Department.
Provides an introduction to ecological and epidemiologic concepts basic to the control of infectious agents. Considers important parasitic and viral diseases of particular significance in the developing areas of the world. Epidemiologic principles of vector-associated diseases are elucidated through study of entities such as malaria and schistosomiasis. Prior knowledge of the pathogenesis of disease produced by infectious agents is desirable.

TPH 202b. Epidemiology of Infectious Diseases of Public Health Importance in Developing Countries
Lectures, team meetings. *Two 2-hour sessions each week. 2.5 units.* Dr. Cash, Dr. Weisfeld, Guest Lecturers.
The epidemiology of infectious diseases of public health importance in developing countries will be thoroughly reviewed. Only those diseases caused by bacteria or virus will be discussed. Emphasis will be placed on the epidemiology patterns of these diseases as they relate to different geographic and socioeconomic environments. Methods of disease surveillance, especially as they relate to prevention and control, will also be stressed. Case studies will be used with student teams proposing solutions to the problems.
Enrollment limited to 60 and subject to approval of the instructors if students have no previous background in health care delivery.

TPH 204c. Introduction to the Techniques of Investigation of Parasitic Infections
Lectures, laboratory, seminars. *Two 3-hour sessions each week. One 2-hour additional laboratory session each week, to be arranged. 5 units.* Dr. Pan.
Emphasizes laboratory methods for the study of parasitic diseases of public health importance. Provides exposure to theory and application techniques essential to epidemiologic and laboratory investigation. Life cycles of several parasites maintained and examined with respect to detection and quantification of infection, immunity and control.
Enrollment limited to 15 and subject to approval of the instructors. Preference given to concentrators in tropical public health and cancer biology.

TPH 205c. Clinical and Pathologic Features of Tropical Diseases
Case presentations, clinico-pathologic conferences, demonstrations. *One 2-hour session each week. 1 unit.* Dr. Boyer, Dr. Dammin, Dr. Franz von Lichtenberg (Professor of Pathology, Harvard Medical School), Members of the Department, Members of the Pathology Department.
Designed for students particularly interested in tropical medicine. Emphasis is on the clinicopathologic aspects of tropical diseases. At each session, disease entities are introduced by presenting a clinical case, and pertinent clinical and pathologic features of the disease are then reviewed.
Enrollment subject to approval of the instructors.

TPH 206d. Principles of Public Health Entomology
Lectures, laboratories, seminars, field trips. *One 2-hour session and one 3-hour session each week. 3.5 units.* Dr. Spielman, Dr. Rossignol.
The manner in which arthropods transmit disease and the principles of vector control are discussed from ecological, physiological and genetic points of view. Class sessions introduce concepts and techniques currently employed in controlling vector-borne disease. Weekend field trips provide an opportunity for students to apply skills acquired in the classroom.
Prereq. TPH 201a or suitable biology background and permission of the instructors.

TPH 208d. Current Problems in Schistosomiasis
Lectures and seminars. *One 2-hour session each week. 2 units.* Dr. Chernin, Members of the Department.
The problems posed by schistosomiasis as an expanding health hazard are presented in a series of lectures and seminars. Emphasis is given to the biology of snail vectors, to problems of assessment of significance of the disease and to the potentials of various approaches to control.
Prereq. TPH 201a or permission of the instructors.

TPH 210c. Current Problems in Malariology
Lectures, seminars. *One 2-hour session each week. 2 units.* Dr. Hoff, Dr. Spielman, Members of the Department.
Reviews the biology of the malaria parasite, emphasizing factors that particularly affect transmission and human morbidity and mortality. Introduces the principles of malariometry and the strategies for controlling malaria. Analyzes current control programs in seminar discussions. Prereq. TPH 201a and permission of the instructors.

TPH 216c,d. The Biology of Parasitism (HMS Imm. 721.0, FAS Imm. 214)
Lectures, discussions. *One 3-hour session each week. 2.5 units.* Dr. David, Dr. Wirth, Members of the Department, Guest Lecturers.
Covers aspects of the biology, immunology and molecular biology of various protozoa and helminths. Includes discussion on the mechanism of immune evasion, mechanism of antigenic variation, and the biology and immunology of malaria, schistosomes, filariae, leishmania, amoeba, and trypanosomes. Each session requires reading three or four papers in the literature and writing answers to problem sets.
Prereq. Suitable course in basic immunology and biology and permission of the instructors.

TPH 300a,b,c,d,e. Tutorial Programs
Laboratory exercises. *Time and credit to be arranged.* Individual work for candidates at the master's degree level may be carried out under supervision of a member of the Department. Various parasites of medical importance are maintained and are available for studies on immunology, molecular biology, cell biology, biochemistry, and chemotherapy. Arrangements subject to approval of the instructor.

TPH 350. Research
Doctoral candidates or qualified full-time special students may undertake original investigations in the laboratory or in the field by arrangement with the Chairman of the Department.
Members of the Department are currently engaged in the following areas of research:

Biology, host-parasite relationships and control of protozoa and helminths

Population genetics, nutrition and reproduction of medically important arthropods

Immunology of protozoa and helminths

Molecular biology of protozoa and helminths

Arthropod transmission of viral, protozoan and helminthic agents

Cultivation in vitro *of parasitic helminths and protozoa of medical importance*

Facing page, Dr. Dyann Wirth, Assistant Professor of Tropical Public Health.

Officers of Instruction and Research

William Alonso, A.B., M.C.P (Harvard University); Ph.D. (University of Pennsylvania), Richard Saltonstall Professor of Population Policy (*Population Sciences*) (on leave 1984-85).

David Alan Amato, A.B. (Colgate University); S.M., Ph.D. (Cornell University), Assistant Professor of Biostatistics; *Dana Farber Cancer Institute.*

Mary Ochsenhirt Amdur, S.B. (University of Pittsburgh); Ph.D. (Cornell University), Associate Professor of Toxicology (*Environmental Science and Physiology*); *Lecturer, Massachusetts Institute of Technology.*

James Robert Anderson, A.B. (State University of New York at Buffalo); Ph.D. (University of Washington at Seattle), Assistant Professor of Biostatistics; *Dana Farber Cancer Institute.*

Jennifer Jane Anderson, B.Sc., M.Sc., (Otago University, New Zealand); Ph.D. (Boston University), Visiting Assistant Professor of Biostatistics; *Research Assistant Professor, Biostatistics, Boston University* (to December 1984).

Harry Nicholas Antoniades, B.S., Ph.D. (Athens University, Greece), Professor of Biochemistry (*Nutrition*); *Senior Investigator, Blood Research Institute, Inc., Boston.*

John Christian Bailar, III, A.B. (University of Colorado); M.D. (Yale University); Ph.D. (American University), Lecturer on Biostatistics; *Senior Science Adviser, U.S. Department of Health and Human Services.*

Edward Lamar Baker, Jr., A.B. (Vanderbilt University); M.D. (Baylor College of Medicine); M.P.H., S.M. in Phys. (Harvard University), Associate Professor of Occupational Medicine (*Environmental Science and Physiology*).

Robert Bruce Banzett, S.B. (Pennsylvania State University); Ph.D. (University of California at Davis), Assistant Professor of Physiology (*Environmental Science and Physiology*).

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Gretchen Mary Berggren, A.B. (Nebraska State College); M.D. (University of Nebraska); S.M. in Hyg. (Harvard University), Lecturer on Population Sciences.

Bengt Erik Bjarngard, M.Sc., D.Sc. (University of Lund, Sweden), Lecturer on Medical Radiation Physics (*Environmental Science and Physiology*); *Professor of Radiation Therapy, Harvard Medical School.*

Elkan Rogers Blout, A.B. (Princeton University); Ph.D. (Columbia University), A.M. (hon.) (Harvard University), D.Sc. (hon.) (Loyola University), Member of the Faculty of Public Health and Dean for Academic Affairs; *Edward S. Harkness Professor of Biological Chemistry, Harvard Medical School.*

Leslie Irvin Boden, A.B. (Brandeis University); Ph.D. (Massachusetts Institute of Technology), Assistant Professor of Economics (*Environmental Science and Physiology* and *Health Policy and Management*).

Markley Holmes Boyer, A.B. (Princeton University); M.D. (University of Pennsylvania); D.Phil. (Magdalen College, Oxford University); M.P.H. (Harvard University), Lecturer on Tropical Public Health.

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James Preston Butler, A.B. (Pomona College); A.M., Ph.D. (Harvard University), Assistant Professor of Biomathematics (*Environmental Science and Physiology*).

John Cairns, M.D., B.A., B.M.,B.Ch., D.M. (Oxford University); A.M. (hon.) (Harvard University), Professor of Microbiology (*Cancer Biology*).

Richard Alan Cash, S.B. (University of Wisconsin); M.D. (New York University); M.P.H. (The Johns Hopkins University), Director, Office of International Health Programs, and Lecturer on Tropical Public Health; *Institute Fellow, Harvard Institute for International Development.*

Eli Chernin, S.B. (College of City of New York); A.M. (University of Michigan); S.D. (The Johns Hopkins University), A.M. (hon.) (Harvard University), Professor of Tropical Public Health.

Allen Carrol Crocker, A.B. (Massachusetts Institute of Technology); M.D. (Harvard University), Lecturer on Maternal and Child Health (*Maternal and Child Health*); *Associate Professor of Pediatrics, Harvard Medical School.*

Allen Latham Cudworth, B.E.E. (University of Alabama); M.E.E. (Massachusetts Institute of Technology); S.D. in Hyg. (Harvard University), Lecturer on Applied Acoustics and Environmental Health (*Environmental Science and Physiology*); *Vice President of Liberty Mutual Insurance Company and Director, Hopkinton Research Center.*

William John Curran, J.D. (Boston College); LL.M., S.M. in Hyg. (Harvard University), Frances Glessner Lee Professor of Legal Medicine in the Faculty of Medicine and the Faculty of Public Health (*Health Policy and Management* and *Maternal and Child Health*).

John Rouben David, A.B. (College of the University of Chicago); M.D. (University of Chicago Medical School); A.M. (hon.) (Harvard University), John LaPorte Given Professor of Tropical Public Health; *Professor of Medicine, Harvard Medical School.*

Richard Dennis, S.B. (Northeastern University); S.M. (Harvard University), Associate Professor of Applied Environmental Health Engineering (*Environmental Science and Physiology*); *Director, Pollution Control Laboratory, G.C.A. Corporation, Bedford.*

Guy Blaudin de Thé, M.D. (University of Marseille Faculty of Medicine); Ph.D. (University of Paris - Sorbonne), Lecturer on Microbiology (*Cancer Biology*); *Professor, Université Claude Bernard, France.*

Eva Yona Deykin, A.B. (Radcliffe College); S.M. (Simmons College); M.P.H., Dr.P.H. (Harvard University), Assistant Professor of Social Work (*Maternal and Child Health*).

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Margaret Elizabeth Drolette, A.B. (Radcliffe College); M.P.H., Ph.D. (Harvard University), Professor of Biostatistics; Chief Coordinator of the Master of Public Health Program.

Johanna Todd Dwyer, S.B. (Cornell University); S.M. (University of Wisconsin); S.M. in Hyg., S.D. in Hyg. (Harvard University), Lecturer on Maternal and Child Health Nutrition (*Maternal and Child Health*); *Director, Stern Nutrition Center, Tufts Medical Center.*

Arthur James Dyck, A.B. (Tabor College); A.M. (University of Kansas); Ph.D. (Harvard University), Mary B. Saltonstall Professor of Population Ethics; *Member of the Faculty of the Harvard Divinity School.*

Eric Eisenstadt, A.B., Ph.D. (Washington University), Associate Professor of Microbiology (*Cancer Biology* and *Toxicology*).

Michael John Ellenbecker, B.E.E. (University of Minnesota); S.M. (University of Wisconsin); S.M. in Env.H., S.D. in Env.H. (Harvard University), Assistant Professor of Industrial Hygiene Engineering (*Environmental Science and Physiology*).

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David Paul Harrington, A.B. (Tufts University); A.M., Ph.D. (University of Maryland), Visiting Associate Professor of Biostatistics.

Joseph John Harrington, B.C.E. (Manhattan College); A.M., Ph.D. (Harvard University), Professor of Environmental Health Engineering (*Environmental Science and Physiology* and *Population Sciences*) in the Faculty of Public Health and Gordon McKay Professor of Environmental Engineering in the Faculty of Arts and Sciences.

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John Hedley-Whyte, B.A., M.B., B.Chir., M.A., M.D. (Cambridge University, England), Member of the Faculty of Public Health (*Health Policy and Management*); *David S. Sheridan Professor of Anaesthesia and Respiratory Therapy, Harvard Medical School.*

David Hemenway, A.B. (Harvard University); A.M. (University of Michigan); Ph.D. (Harvard University), Lecturer on Political Economy (*Health Policy and Management*).

Albert Edwin Henn, S.M. (Michigan State University); M.D. (Wayne State University); M.P.H. (Harvard University), Lecturer on Health Policy and Management; *Joint Coordinator for International Projects, Harvard Institute for International Development.*

Manuel Guillermo Herrera-Acena, A.B., M.D. (Harvard University), Lecturer on Nutrition; *Research Associate, Harvard Institute for International Development.*

Regina Elbinger Herzlinger, S.B. (Massachusetts Institute of Technology); D.B.A. (Harvard University), Member of the Faculty of Public Health (*Health Policy and Management*); *Professor of Business Administration, Harvard Business School.*

Joachim Heyder, B.A. (Humbolt Universitat, Berlin); Ph.D. (Goethe-Universitat), Visiting Associate Professor of Environmental Science and Physiology; *Lecturer, Goethe-Universitat, Frankfurt.*

Howard Haym Hiatt, M.D. (Harvard University); Sc.D. (hon.) (Northeastern University), Professor of Medicine in the Faculty of Medicine and the Faculty of Public Health (*Health Policy and Management)* (on leave 1984-85).

Rodney Hoff, S.B. (University of Wisconsin); M.P.H. (University of North Carolina); S.M., S.D. in Tr.P.H. (Harvard University), Assistant Professor of Tropical Public Health.

Donald Frederick Hornig, S.B., Ph.D. (Harvard University), Alfred North Whitehead Professor of Chemistry in Public Health (*Environmental Science and Physiology*); Director of Interdisciplinary Programs in Health.

William Ching-Lung Hsiao, A.B. (Ohio Wesleyan University); M.P.A., Ph.D. (Harvard University), Associate Professor of Economics (*Health Policy and Management*); *Member of the Faculty of Harvard Business School.*

George Barkley Hutchison, A.B., M.D., M.P.H. (Harvard University), Professor of Epidemiology.

Boris Iglewicz, S.B., A.M. (Wayne State University); Ph.D. (Virginia Polytechnic Institute), Visiting Professor of Biostatistics; *Professor of Statistics, Temple University.*

Roland Harrison Ingram, Jr., S.B. (University of Alabama); M.D. (Yale University), Member of the Faculty of Public Health (*Environmental Science and Physiology*); *Parker V. Francis Professor of Medicine, Harvard Medical School.*

Philip Frank Judy, S.B., S.M., Ph.D. (University of Wisconsin), Lecturer on Medical Radiation Physics (*Environmental Science and Physiology*); *Assistant Professor of Radiology, Harvard Medical School.*

Michele Jungery, S.B. (University of Colorado); S.M. (University of Colorado); M.P.H., Ph.D. (University of California, Berkeley), Assistant Professor of Tropical Public Health.

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Virginia Ann Rauh, S.D., Visiting Lecturer on Maternal and Child Health.

Thomas Michael Reardon,, J.D., Lecturer on Health Law (*Health Policy and Management*).

Mark Lewis Rosenberg, M.D., M.P.P., Visiting Lecturer on Health Services (*Health Policy and Management*).

Jacqueline Miller Rosenthal, M.P.H., Visiting Lecturer on Health Services (*Health Policy and Management*).

Fay Adrienne Rozovsky, J.D., M.P.H., Visiting Lecturer on Health Law (*Health Policy and Management*).

James Ryan, M.D., Visiting Lecturer on Occupational Health (*Environmental Science and Physiology*).

Richard Martin Ryan, S.D. in Hyg., Lecturer on Health Services (*Maternal and Child Health*).

Kenneth Wayne Samonds, Ph.D., Visiting Lecturer on Nutrition.

Elizabeth Woodland Sands, J.D., Visiting Lecturer on Health Services (*Health Policy and Management*).

Philip Earl Sartwell, M.D., M.P.H., Visiting Lecturer on Epidemiology.

A. Faye Schrater, Ph.D., Visiting Lecturer on Immunoparasitology (*Tropical Public Health*).

Nevin Stewart Scrimshaw, Ph.D., M.D., M.P.H., Visiting Lecturer on Tropical Public Health.

Jack M. Selby, S.B., Visiting Lecturer on Radiation Protection (*Environmental Science and Physiology*).

David Judson Sencer, M.D., M.P.H., Visiting Lecturer on Tropical Public Health.

Stuart Howard Shapiro, M.D., M.P.H., Visiting Lecturer on Health Services (*Health Policy and Management*).

Temple Ferris Smith, Ph.D., Lecturer on Molecular Biophysics (*Biostatistics*).

Patricia Ann Sohl, M.D., M.P.H., Visiting Lecturer on Health Policy (*Health Policy and Management*).

Kenneth Earl Stanley, Ph.D., Visiting Lecturer on Epidemiology.

Allen Howard Storm, M.D., M.P.H., Lecturer on Occupational Health (*Environmental Science and Physiology*).

Donald Ernest Strange, M.B.A., Visiting Lecturer on Health Policy and Management.

Thomas John Stranova, M.P.H., Visiting Lecturer on Health Policy and Management.

Phillip George Stubblefield, M.D., Visiting Lecturer on Maternal Health (*Maternal and Child Health*).

James Oliver Taylor, M.D., Visiting Lecturer on Health Services (*Health Policy and Management*).

Eoin William Trevelyan, D.B.A., Lecturer on Management (*Health Policy and Management*).

Michael Oliver Varner, S.M. in Hyg., Visiting Lecturer on Industrial Hygiene (*Environmental Science and Physiology*).

Franz Cornelius von Lichtenberg, M.D., Lecturer on Tropical Public Health.

Christine Waternaux, Ph.D., Lecturer on Biostatistics.

Carl Norman Wathne, S.M., Visiting Lecturer on Health Services (*Health Policy and Management*).

David Howe Wegman, M.D., S.M. in Phys., Visiting Lecturer on Occupational Health (*Environmental Science and Physiology*).

Jason Stanley Weisfeld, M.D., M.P.H., Visiting Lecturer on Tropical Public Health.

Peter Fahey Weller, M.D., Visiting Lecturer on Tropical Public Health.

Barbara Graham Werner, Ph.D., Visiting Lecturer on Microbiology (*Cancer Biology*).

Jay Andrew Winsten, Ph.D., Lecturer on Health Services (*Health Policy and Management*).

Michele Sandra Winsten, S.M. in H.P.&M., Visiting Lecturer on Health Policy and Management.

Joe David Wray, M.D., M.P.H., Visiting Lecturer on Population Sciences.

Grace Wyshak, Ph.D., Lecturer on Biostatistics.

Lynne Margaret Ausman, S.D. in Nutr., Research Associate in Nutrition.

Tamara Eugenia Awerbuch, Ph.D., Research Associate and Lecturer on Biostatistics.

Lester Carl Bartholow, S.D. in Nutr., Visiting Research Associate in Nutrition.

Barbara Doris Beck, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Paul Cushwa Billings, Ph.D., Research Associate in Radiobiology (*Cancer Biology*).

Charles Myron Blatt, M.D., Research Associate in Cardiology (*Nutrition*).

Hussein Abdilahi Bulhan, Ph.D., M.P.H., Visiting Research Associate in Psychology (*Behavioral Sciences*).

Ruth Margaret Butler, S.M., Research Associate in Social Work (*Maternal and Child Health*).

Gerald Lokchung Chan, S.D. in Phys., Research Associate in Cancer Biology.

Shu-heh Wang Chu, Ph.D., Research Associate in Nutrition.

Mary Antoinette Walz Ciconni, Ph.D., Research Associate in Tropical Public Health.

Letitia Katherine Davis, Ed.M., S.D., Research Associate in Occupational Health (*Environmental Science and Physiology*).

Kenneth Demerjian, Ph.D., Visiting Scientist in Environmental Science and Physiology.

Douglas William Dockery, S.D. in Env. H., Research Associate in Environmental Health (*Environmental Science and Physiology*).

Ellen Aura Eisen, S.D., Research Associate in Occupational Health (*Environmental Science and Physiology*).

Eric Eliot Fortess, S.D., Visiting Research Associate in Health Administration (*Institute for Health Research*).

Anna Gotsis Gallagher, Assistant in Nutrition.

Richard Bradley Gamble, A.M., Consultant on Population Problems (*Population Sciences*).

Jack Mark Goldstein, Ph.D., Consultant on Instrumentation (*Population Sciences*).

Thomas Barr Graboys, M.D., Research Associate in Cardiology (*Nutrition*).

Laura Carolyn Green, Ph.D., Research Associate in Health Policy (*Health Policy and Management*).

S. Katharine Hammond, Ph.D., Research Associate in Industrial Hygiene (*Environmental Science and Physiology*).

Margaret Louise Harbison, V.M.D., Visiting Research Associate in Respiratory Biology (*Environmental Science and Physiology*).

Sara Harkness, Ph.D., Research Associate in Maternal and Child Health and Lecturer on Population Sciences.

Patricia Henson, Ph.D., Research Associate in Radiobiology (*Cancer Biology*).

Hugh Robert Holtrop, M.D., Research Associate and Lecturer on Population Studies (*Population Sciences*).

Frederic Gallatin Hoppin, Jr., M.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Chang-I Hua, Ph.D., Research Associate in Population Studies (*Center for Population Sciences*).

Joseph Michael Hunt, S.M., Research Associate in Human Ecology (*Population Sciences*).

William Russell Kimball, Ph.D., M.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Eva Hedvika Krug, S.D., Visiting Scientist in Toxicology.

Andrzej Stefan Krolewski, M.D., Research Associate in Epidemiology.

Steven Lampert, M.D., Research Associate in Cardiology (*Nutrition*).

Tun-Hou Lee, S.D., Research Associate in Virology (*Cancer Biology*).

Richard Errol Letz, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Stephen Paul Lewontin, A.M., Research Associate in Economic History (*Population Sciences*).

Robert Denis Lynch, S.D. in Nutr., Research Associate in Nutrition.

Najwa Hanna Makhoul, Ph.D., Visiting Research Associate in Population Sciences.

Robert Burnett McGandy, M.D., M.P.H., Consultant on Pathology (*Nutrition* and *Cancer Biology*).

Stephan Sherman Miller, Ph.D., Research Associate in Microbiology (*Cancer Biology*).

Gerald Murray, Ph.D., Research Associate in Population Studies (*Center for Population Sciences*).

Hatsumi Nagasawa, Ph.D., Research Associate in Radiobiology (*Cancer Biology*).

Panagiotis Pantazis, Ph.D., Research Associate in Nutrition.

Ralph J. Parod, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Geoffrey Pasvol, M.D., Ph.D., Visiting Research Associate in Tropical Public Health.

Joseph Piesman, S.D. in Tr.P.H., Research Associate in Tropical Public Health.

Philip Jack Podrid, M.D., Research Associate in Cardiology (*Nutrition*).

Charles Joseph Puccia, Ph.D., Research Associate in Marine Ecology and Complex Systems (*Population Sciences*).

Ernst Albrecht Raeder, M.D., Research Associate in Cardiology (*Nutrition*).

Michael Baron Reid, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Jean-Loupe Jacques Marie Romet-Lemonne, M.D., Research Associate in Cancer Biology.

Philippe Albert Rossignol, Ph.D., Research Associate in Tropical Public Health.

Stephen Norman Rudnick, S.D. in Env.H., Research Associate in Environmental Health Engineering (*Environmental Science and Physiology*).

Peter Barry Ryan, Ph.D., Research Associate in Air Pollution (*Environmental Science and Physiology*).

Kalman Francis Salata, Ph.D., Research Associate in Nutrition.

Richard Benson Saltman, Ph.D., Research Associate in Political Science (*Health Policy and Management*).

Sonja Sandberg, Ph.D., Research Associate in Clinical Decision Analysis (*Institute for Health Research*).

Jeffrey Lawrence Schwartz, Ph.D., Research Associate in Radiobiology (*Cancer Biology*).

Daniel Henry Seeley, Ph.D., Research Associate and Lecturer on Biochemistry (*Population Sciences*).

Jeffrey Coleman Smith, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Charles McAfee Super, Ph.D., Research Associate in Psychology (*Nutrition*).

Theresa Dorothy Sweeney, Ph.D., Research Associate in Physiology (*Environmental Science and Physiology*).

Nobuyoshi Tachibana, M.D., Visiting Scientist in Cancer Biology.

Clayton Lay Thomas, M.D., M.P.H., Consultant on Human Reproduction (*Population Sciences*).

Charles William Todd, Ph.D., Research Associate in Tropical Public Health.

Robert Scott Umans, Ph.D., Research Associate in Radiobiology (*Cancer Biology*).

Agnes Maria Van Langenhove, Ph.D., Research Associate in Nutrition.

Helene Vetrovs, Assistant in Radiobiology (*Cancer Biology*).

Edward Francis Voelkel, Research Associate in Toxicology.

Carmen Alonso Whipple, Ph.D., Research Associate and Lecturer on Population Studies (*Population Sciences*).

Adele Wolfson, Ph.D., Research Associate in Reproductive Biology (*Population Sciences*).

Jack Mikhail Wolfson, Ph.D., Research Associate in Environmental Health Sciences (*Environmental Science and Physiology*).

Yukio Yanagisawa, D.Eng., Visiting Research Associate in Physical Sciences and Engineering (*Environmental Science and Physiology*).

Stella Bernadette Yen, M.D., M.P.H., Research Associate in Epidemiology (on leave 1984-85).

George Yerganian, Ph.D., Senior Research Associate in Cytogenetics (*Population Sciences*).

Paul Maximillian Densen, A.B., S.D., A.M. (hon.), Professor of Community Health, Emeritus (1980).

Dana Lyda Farnsworth, A.B., S.B., M.D., S.D. (hon.), Henry K. Oliver Professor of Hygiene, Emeritus (1971).

Roy Orval Greep, S.B., S.M., Ph.D., A.M. (hon.), S.D. (hon.), John Rock Professor of Population Studies, Emeritus (1974).

David Mark Hegsted, S.B., S.M., Ph.D., A.M. (hon.), Professor of Nutrition, Emeritus (1980).

Nathan Keyfitz, B.Sc., Ph.D., Andelot Professor of Sociology in the Faculty of Arts and Sciences and of Demography in the Faculty of Public Health, Emeritus (1983).

Alexander Hamilton Leighton, A.B., A.M., M.D., A.M. (hon.), Professor of Social Psychiatry, Emeritus (1975).

Robert Balentine Reed, A.B., A.M., Ph.D., A.M. (hon.), Professor of Biostatistics, Emeritus (1982).

Roger Randall Dougan Revelle, A.B., Ph.D., S.D. (hon.), A.M. (hon.), L.H.D., LL.D., Richard Saltonstall Professor of Population Policy, Emeritus (1978).

Elizabeth Prince Rice, A.B., S.M., Associate Professor of Public Health and Social Work, Emerita (1967).

William Morris Schmidt, S.B., M.D., A.M. (hon.), Professor of Maternal and Child Health, Emeritus (1973).

John Crayton Snyder, A.B., M.D., LL.D., Professor of Population and Public Health, Emeritus (1976).

Fredrick John Stare, S.B., S.M., Ph.D., M.D., A.M. (hon.), S.D. (hcn.), D.Sc. (hon.), Professor of Nutrition, Emeritus (1980).

James Laverre Whittenberger, S.B., M.D., A.M. (hon.), James Stevens Simmons Professor of Public Health; Professor of Physiology, Emeritus (1982).

Jane Worcester, A.B., Dr.P.H., S.D. (hon.), Professor of Biostatistics and Epidemiology, Emerita (1977).

Alonzo Smythe Yerby, S.B., M.D., M.P.H., Professor of Health Services Administration, Emeritus (1982).

APPLICANTS

Please detach the cards and application materials following and return to the Admissions Office.

APPLICANT — PLEASE FILL OUT THIS SIDE

Application File Card

NAME _____
last or family name first name middle name

OCCUPATION (indicate code no. from p. 2a) _____

COUNTRY OF CITIZENSHIP _____

PREVIOUS DEGREES _____

PRESENT ADDRESS _____

_____

_____

Telephone _____

PERMANENT ADDRESS _____

_____

_____

Telephone _____

(over)

PLEASE PRINT

Name _____ _____
Last First Middle Date

Address _____
Street, Route or Post Office Box

_____
City State Zip Code

Tel. Day _____ Evening _____
Area Code No. Ext. Area Code No. Ext.

Previous Degrees	College/University	Dates Attended	Degree	Major Field
	1.			
	2.			
	3.			

Present Occupation _____

Please list your career interest and probable departmental field of study (refer to the School's catalog) at the Harvard School of Public Health.

_____

_____

_____

IF YOU WISH TO CONSULT WITH AN HSPH GRADUATE, PLEASE COMPLETE AND MAIL CARD.

We would like to refer you to an alumnus in your area whose training and professional activities coincide with the field you are considering.

FT/FT _____

Name _____ _____

OFFICE USE ONLY

_____ _____ _____

DEGREE/DEPT/SPEC

Date _____ MF DB _____ EC/MS _____ _____

ADMISSIONS ACTION _____

DEPT HOLD REJ ACC DEF _____ _____

_____ _____

CAD HOLD REJ ACC DEF _____ _____

APPLICANT ACTION _____

ACC	CON	DEP	WBD	WDA	DEF	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Harvard School of Public Health
Alumni Office
677 Huntington Avenue
Boston, MA 02115

Please put
stamp here.
The Post Office will
not deliver mail
without postage

Harvard School of Public Health
Admissions Office
677 Huntington Avenue
Boston, MA 02115

ONLY COMPLETE APPLICATIONS WILL BE CONSIDERED BY THE ADMISSIONS OFFICE.

Introduction

These instructions have been prepared to assist those applying to the Harvard School of Public Health. For specific information on programs, admission requirements, tuition and expenses, please refer to the Harvard School of Public Health catalog.

We suggest that you keep these instructions for future reference after you have removed the application materials. If you have further questions, please contact the

Admissions Office
Harvard School of Public Health
677 Huntington Avenue
Boston, Massachusetts 02115
Telephone: 617-732-1030

You must submit your application, three letters of reference, and your transcripts at the *same time*. Read further for information concerning GAPSFAS, GRE, and TOEFL.

It is important that your application be accurate and complete. Occasionally candidates for admission have made inaccurate statements or submitted false material in connection with their applications. In most cases these misrepresentations are discovered during the admissions process, and the application is rejected with notification to such other universities or testing services as may be appropriate. If a misrepresentation is discovered after a candidate is admitted or a degree has been awarded, dismissal or revocation of the degree will ordinarily result.

As a matter of policy, Harvard University does not discriminate among applicants and students in admission, educational policies, scholarship and loan programs, and athletic and other programs on the basis of race, religion, sex, national origin, color, handicap, sexual orientation, Vietnam era or veteran status, marital or parental status, or age.

Increasing numbers of students with disabilities are enrolling at Harvard and are participating in a wide range of programs and activities. Every effort will be made to meet special needs. There are, however, no separate academic programs for either the physically handicapped or for students with learning disabilities; all enrolled students undertake the same program.

Application Deadlines

Candidates are advised to apply as early as possible to allow enough time for careful consideration, as many more applications are received than can be accepted.

Applicants are encouraged to submit their completed application (with references and transcripts) by February 1.

Information for Foreign Students

Please refer to the Harvard School of Public Health catalog for information concerning *Language Proficiency, Financial Certification and Living Expenses* for an academic year at Harvard. The School of Public Health must have certification of English proficiency and of the source and amount of financial support for the foreign student's academic program before the immigration form needed to obtain a visa can be issued.

Applicants for admission from other countries should arrange for their funding as soon as they apply for admission, since financial application deadlines ordinarily occur well before admissions decisions are completed by the School. Foreign students are ordinarily not eligible to apply for financial aid from the School of Public Health since the major source of the School's student support is from U.S. government grants or traineeships and the guaranteed student loan program for which U.S. citizenship, or permanent resident status, is required. Foreign nationals should apply through their own ministries of health or education or through their universities for any sources of support for which they may be eligible, including Harvard University scholarships specifically designated for citizens of foreign countries. Nominations of candidates for such awards are customarily made by selection committees in the country of origin.

Additional information may be obtained by writing to:
Ms. Margaret C. Salmon
Director of Financial Aid
Harvard School of Public Health
677 Huntington Avenue
Boston, MA 02115

See **Section T** which describes the Test of English as a Foreign Language (TOEFL). Applicants are urged to take the TOEFL at the earliest date possible.

General Information and Policies on Financial Aid for U.S. Citizens and Permanent Resident Aliens

The Harvard School of Public Health is a recipient of training grant funds from federal and private sources for support of students in a variety of programs. Some of these grants provide full or partial tuition and some also include stipend support. Since Departments and Programs may also award their own fellowships, applicants are advised to inquire about the availability of funding through the Departments or Programs to which they are applying.

The Harvard School of Public Health participates in the Guaranteed Student Loan Program, the National Direct Student Loan Program, the PLUS Program, and the College Work-Study Program. The Guaranteed Student Loan Program (GSL) permits a graduate student who is a U.S. citizen or who has immigrant status to borrow up to $5,000 a year under the GSL program, provided the student has less than $20,000 in outstanding loans through this program. Loans awarded through the National Direct Student Loan Program (NDSL) are determined by the Financial Aid office, based on a strict need analysis. A student may apply for up to $3,000 a year through the PLUS Loan Program, provided the student passes certain eligibility requirements. In addition to these loan programs, a full-time student may borrow through the Health Education Assistance Loan Program, (HEAL), a federally insured loan program for a graduate student who is either a U.S. Citizen or has immigrant status. Eligible lenders are participating banks.

In order to qualify for financial assistance through most fellowships, loans, and work study, applicants must file:

1. The Harvard School of Public Health form entitled "Application for Financial Assistance" (included in these application materials)

2. The GAPSFAS Financial Statement. (NOTE: the form should be for the academic year in which the applicant intends to matriculate at the Harvard School of Public Health). The appropriate form can be obtained by writing to:

Graduate and Professional School
Financial Aid Service
Princeton, New Jersey 08540

(Please Note: The GAPSFAS is required of all applicants for Financial Aid with the parental section completed for those who are classified as dependent and all applicants under 25.)

The GAPSFAS application should be filed as early as possible to allow several weeks for the application to be processed. Please submit a copy of your GAPSFAS application with the Harvard School of Public Health Application for Financial Assistance.

The Committee on Financial Aid makes decisions by comparing personal resources with estimated expenses for the academic year. Federal funds are allocated according to the student's area of concentration and career goals. Applicants will not be considered for loans and/or fellowships until they have been admitted to the School by the Committee on Admissions and Degrees and until all documents for financial assistance have been received.

Any materials submitted become the property of the Harvard School of Public Health

Application Materials

Application Form. The application form should be removed carefully. Please type, if possible, or print in black ink. Mail the form to:

Admissions Office
Harvard School of Public Health
677 Huntington Avenue
Boston, Massachusetts 02115

Address Labels. To facilitate correspondence with you please fill out the attached address labels and return them with your application form. The labels should indicate your address from the time of application to June 15. **Be sure to notify the Admissions Office of any change in address.**

Reference Letters. Three recommendation forms are enclosed. Please complete the upper portion of these forms and forward them to college or graduate school instructors who know you personally and can describe your academic performance and ability. If you have had any working experience in the health field or in administration, you may send one or two of these forms to a person or persons able to evaluate your performance in that role. Please instruct these three individuals to return their letters of recommendation, sealed in an envelope, to you in the self-addressed envelopes that you will provide. DO NOT OPEN THEM. Enclose the letters of reference with the rest of your application materials.

Federal legislation gives each student who is admitted and who enrolls at the Harvard School of Public Health a right of access to his/her educational records. This includes the letters of recommendation submitted in the admissions process. You may waive this right, if you so desire, by signing the waiver statement on each recommendation form before sending it to the person from whom you are requesting a letter of recommendation. Please note that signing this waiver *is not required* as a condition for admission to, receipt of financial aid from, or receipt of any other services or benefits from, the Harvard School of Public Health. If you waive access, these recommendation forms may be used only by this School's Admissions Committee this year, and may not be duplicated.

Application for Financial Assistance. U.S. citizens and permanent residents who wish to apply for financial aid from the Harvard School of Public Health should fill out the application form for financial assistance and return it to the Financial Aid Office. File the GAPSFAS form of the Graduate and Professional School Financial Aid Service, Princeton, N.J. 08540 as early as possible.

Please read and sign the statement at the beginning of the application. The application will not be considered complete unless it is signed and dated.

D. Please record U.S. Social Security number only.

E. Type of visa may be specified as Student Visa (F-1), Exchange Visitor Visa (J-1), Permanent Resident Visa, etc.

G. Optional Question on Minority Status
Harvard University is committed to the education of qualified persons from minority ethnic backgrounds. To assist the School of Public Health in carrying out this commitment, United States applicants are encouraged to check the predominant ethnic background that is applicable.

H. Transcripts. Official transcripts of all academic records, both undergraduate and graduate are required and must be issued directly from the institution. Please request the institutions concerned to send your transcripts sealed to you in the self-addressed envelopes you will provide. DO NOT OPEN THEM. If an institution will not provide you with an official transcript in a sealed envelope, please have that institution send your official transcript to the Admissions Office. Enclose the letters of reference, transcripts, and application materials in one envelope and forward this to the Admissions Office. Please note that it takes several weeks for an institution to process a transcript.

Foreign Students
If you have received your professional education outside the United States, it is requested that, in addition to sending notarized photostat copies of the diplomas, degrees, etc., you ask the registrar of your college and/or graduate school to forward any remarks, rank in class, position in examinations, etc., to you sealed in a self-addressed envelope. DO NOT OPEN. If an institution will not provide you with an official transcript in a sealed envelope, please have that institution send your official transcript to the Admissions Office. Forward this along with your application materials and letters of reference. This information will be treated as confidential.

J. Please record your most recent occupation from the following list. If none of the categories apply, state "other" and describe your occupation.

01–accountant
02–administrator
03–anthropologist
04–architect
05–bacteriologist
06–biochemist
07–biologist
08–biostatistician
09–chemist
10–clergy
11–dental hygienist
12–dentist
13–dietitian
14–economist
15–educator
16–engineer
17–entomologist
18–environmental scientist
19–epidemiologist
20–health educator
21–health physicist
22–health services administrator
23–historian
24–hospital administrator
25–industrial hygienist
26–information systems specialist
27–journalist
28–laboratory scientist
29–lawyer
30–librarian
31–mathematician
32–medical record librarian
33–nurse
34–nutritionist
35–occupational therapist
36–optometrist
37–parasitologist
38–pharmacist
39–physical therapist
40–physician
41–physicist
42–physiologist
43–podiatrist
44–psychologist
45–rehabilitationist
46–sanitarian
47–social worker
48–sociologist
49–statistician
50–teacher
51–toxicologist
52–veterinarian
53–zoologist
54–bachelor's degree student
55–master's degree student
56–doctoral degree student
57–other
58–medical resident
59–research assistant
98–dental degree student
99–medical degree student

M and N. Please read the sections in the catalog entitled "General Information, Admissions," "Degree Requirements" and "Departments and Programs" before completing these sections. In order to avoid delay and possible rejection of the application because of errors in filling out these items, please pay special attention to the departmental descriptions and degree requirements, especially the requirements for admission to the Master of Public Health and Master of Science degree programs.

Master of Public Health degree applicants who wish to take a general program or departmental concentration will please state this.

Master of Public Health or Master of Science degree applicants who wish to take a *combined* degree program (M.P.H. or S.M. with M.D., D.M.D., D.D.S., D.V.M.) should refer to "Degree Requirements" in the catalog.

Harvard Medical students interested in the combined degree program should discuss their plans with their Medical School adviser and this application must be cosigned by the adviser.

Master of Science and Doctor of Science degrees are awarded in designated fields of concentration. Please indicate the departmental program in which you wish to specialize. Occasionally, students are admitted to a joint program in two departments. Applicants seeking admission on this basis should list both departments.

If there is a specific departmental program in which you are interested, please state it:

Cancer Biology
1 Carcinogenesis
2 Radiobiology
3 Virology, Immunology, and Molecular Genetics

Environmental Science and Physiology
4 Occupational Health
5 Physical Sciences and Engineering
6 Air Pollution Control
7 Environmental Health Management
8 Industrial Hygiene
9 Radiological Health (Radiation Protection)
10 Respiratory Biology
11 Respiratory Epidemiology

Health Policy and Management
12 General H.P.M. (or)
13 Environmental Health Track (or)
14 Medical/Dental Track
15 Health Services Administration International (or)
Law (or)
Management (or)
Policy

Nutrition
16 Nutritional Biochemistry
17 Nutritional Epidemiology

Tropical Public Health
18 Tropical Public Health
19 Medical and Public Health Parasitology
20 Ecology and Control of Vectors of Disease

O. Applicants to degree programs are encouraged to apply for full-time status. If you have checked "Half time" on the application, please explain why you would not be able to enroll on a full-time basis. For more details, please read in the *Catalog*, "Requirements for the Degree" under the degree program to which you are applying.

R. Please indicate on application how you heard about the School:
1 HSPH alumni
2 HSPH student
3 Other Harvard University alumni
4 HSPH faculty
5 Other Harvard University faculty
6 Colleague
7 Employer
8 College placement or counseling office
9 HSPH Admissions Office
10 Educational Testing Service
11 Other

T. Admission Test Requirements.
Graduate Record Examinations (GRE)
Candidates applying for admission must submit scores from the Graduate Record Examination Aptitude Test and these scores may be no more than five years old. Those candidates holding earned doctoral degrees are urged to submit scores from the GRE, or other aptitude tests such as the Dental Admission Test (DAT), Law School Admission Test (LSAT) or Medical College Admission Test (MCAT), if available.

The GRE is required for *all* applicants to the Health Policy and Management and Health Services Administration Programs except physicians, dentists, and medical or dental students who may submit the DAT or MCAT scores, and lawyers who may submit LSAT scores for the masters-level programs.

We urge that candidates arrange to take the Graduate Record Examination no later than the December test administration date.

To prevent the misrouting and loss of test scores it is also recommended that applicants make certain that the proper institution code number is recorded on their GRE registration material. The Harvard School of Public Health code number is **3456-1**. It must be correctly filled out on the GRE registration or score report form submitted to the Educational Testing Service in order to insure prompt receipt of GRE scores in our Admissions Office.

In order to expedite the admissions process, applicants who have taken Graduate Record Examinations in a prior academic year are advised to send a photocopy of their own GRE "Report to the Candidate" when returning their completed application form.

This is an interim step until the official score report is received from the Educational Testing Service and before final action is taken on the application.

Information regarding registration and test administration dates for the Graduate Record Examination may be obtained by writing to:

Graduate Record Examinations
Educational Testing Service
Box 955
Princeton, New Jersey 08540

OR

Graduate Record Examinations
Educational Testing Service
1947 Center Street
Berkeley, California 94704

Test of English as a Foreign Language (TOEFL)
All students applying from countries where English is not the language of instruction must submit scores for the TOEFL to the Admissions office before applications may be considered. A TOEFL score of 550 or above is required for admission. The TOEFL is offered at test centers throughout the world. Applicants should arrange to take the TOEFL no later than the March test administration date.

Information regarding registration, testing locations and test administration dates for the TOEFL may be obtained by writing to:

Test of English as a Foreign Language
Educational Testing Service
Box 955
Princeton, New Jersey 08540

Application Fee

An application fee of $30, which is not refundable, is required for each formal application. A check drawn on a bank in the United States, a postal money order or an international money order, payable to the Harvard School of Public Health, must accompany the application.

Applicants, you must submit *at the same time* to the Admissions Office:

- 3 Recommendation Forms enclosed in 3 sealed envelopes
- Transcripts from other colleges and universities in sealed envelopes
- Admissions Application

Admissions Office use only
Sequence No.
Complete
Fee

Harvard School of Public Health
677 Huntington Avenue
Boston, MA 02115

Admissions Application for Class Entering September 1985

I hereby certify that the information given by me on the various sections of this application is complete and accurate in every respect, and I understand that any misrepresentation may be cause for denial of admission or revocation of a degree.

Date _____ Signature _____

A. **Please type or print in black ink. Enter one letter of name in each box.**

Last or Family Name

First Name Middle Name

B. **Present Address and Telephone Number**

Number and Street or Post Office Box

Use to complete Street or Post Office Address, if needed

City/Town State Zip Code

Country Home Telephone Number (include Area Code) (5 P.M.–9 A.M.)

Until what date is the above address valid? _____ Business Telephone Number (include Area Code) (9 A.M.–5 P.M.)

C. **Permanent Address and Telephone Number**

Number and Street or Post Office Box

Use to complete Street or Post Office Address, if needed

City/Town State Zip Code

Country Telephone Number (include Area Code)

D. **Are you a United States citizen?** 1 ☐ yes 2 ☐ no

if yes, please record your home state _____

if yes, please record your *U.S.* Social Security Number

if no, please record your country of citizenship _____

E. If you are not a U.S. citizen and you are presently residing in the U.S., please indicate the type of visa held and its expiration date. If you are a permanent resident, please indicate and provide a copy of your permanent resident card.

_____

F. **Optional questions for all applicants**

Sex: 1 ☐ Male or 2 ☐ Female Date of birth:

month day year

G. Optional Question for United States citizens and persons with immigrant visas.

Harvard University is committed to the education of qualified persons from minority ethnic backgrounds. To assist the School of Public Health in carrying out this commitment, United States applicants are encouraged to check the predominant ethnic background that is applicable. Please note that this is entirely optional and that failure to answer this question will not adversely affect admissions decisions.

Please indicate predominant ethnic background:

1 ☐ **American Indian or Alaskan Native**—Pertains to descendants of the original peoples of North America.

2 ☐ **Hawaiian**—Pertains to descendants of the original peoples of Hawaii.

3 ☐ **Asian or Pacific Islander**—Pertains to descendants of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands, excluding Hawaii. For example, this area includes China, India, Japan, Korea, the Philippine Islands and Samoa.

4 ☐ **Black, not of Hispanic Origin**—Pertains to descendants of any of the Black racial groups.

5 ☐ **Hispanic**—Pertains to descendants of the original peoples of Spain, Mexico, Puerto Rico, Cuba, Central or South America or peoples of other Portuguese or Spanish culture, regardless of race.

6 ☐ **White, not of Hispanic Origin**—Pertains to descendants of the original peoples of Europe, North Africa or the Middle East.

H. Please list all colleges, graduate and/professional schools attended. (List most recent first.)

Colleges and universities	Location	Dates attended from	Dates attended to	Major field	Degrees (received or expected) type	Degrees (received or expected) date	transcript enclosed	Admissions Office use only G.P.A.

Transcripts: Refer to Application Instructions for information on transcripts.

FT/FT

I. Relevant Professional Experience. (List most recent first.)

Position | Organization and Location | Dates of Employment

_____

_____

_____

J. Please record most recent occupation. (See code on page 2a.)_____ ⌊__⌋__ code How long? ⌊__⌋ years

Have you been or are you an appointee, employee or student of Harvard University? _____

If yes, please explain and enter Harvard University I.D. number. _____

_____

Harvard University I.D. number ⌊__⌋__⌋__⌋ ⌊__⌋__⌋__⌋__⌋__⌋ ⌊__⌋__⌋__⌋

K. Please append a list of any scientific publications you have written.

L. Please list any academic or professional honors, awards or specialty board certification you have received.

_____

M. **Check the degree program to which you are applying. (Please read catalog sections on admission requirements.)**

1 ☐ Master of Public Health
(Prior Master's degree required)
General Program

2 ☐ Master of Public Health
(Prior Master's degree required)
Departmental Concentration
(Check one in N)

3 ☐ Doctor of Public Health
(Prior M.P.H. required)

4 ☐ Master of Occupational Health
(M.D. required)

5 ☐ Master of Science
One-year program

6 ☐ Master of Science
Two-year program

7 ☐ Doctor of Science

8 ☐ Special Student (non-degree)

N. **Please check the department/program to which you are applying. Refer to the catalog for descriptions of departments, programs and degree offerings.**

1 ☐ Behavioral Sciences
2 ☐ Biostatistics
3 ☐ Cancer Biology*
4 ☐ Environmental Science and Physiology*
5 ☐ Epidemiology
6 ☐ Health Policy and Management*
7 ☐ Maternal and Child Health
8 ☐ Nutrition*
9 ☐ Population Sciences
10 ☐ Toxicology
11 ☐ Tropical Public Health*
12 ☐ Division of Biological Sciences

*If you checked any of these, please indicate the name and number of program or track in which you are interested (see list on page 3a).

_____ No.

O. **Are you applying as a 1 ☐ Full-time 2 ☐ Half-time student? (3 ☐ Part-time Special Students only)**
(Please read instructions on page 3a.)
If not full-time, explain why _____

_____

(You may attach a separate sheet for explanation.)

Are your interests primarily ☐ domestic or 1 ☐ international?

P. **If currently applying for admission to a Master's Degree program, do you anticipate applying for the doctoral program later?**
1 ☐ Yes **2** ☐ No **3** ☐ Undecided
N.B. Applicants who check "Yes" will also be reviewed for doctoral potential by both department and School committees.

Q. **How do you plan to finance your education at the Harvard School of Public Health?** (Please check one.)
1 ☐ Self **2** ☐ Parents **3** ☐ Fin. Aid **4** ☐ Employer **5** ☐ Government **6** ☐ Priv. Fnd. ____ **7** ☐ Other _____

R. **To assist in future recruiting, we would appreciate knowing how you heard about the School.** Please see list on page 3a.

_____ No.

If you have corresponded with or have been interviewed by a member of our faculty regarding your plans for graduate study, please enter the name(s) of the person(s) concerned:

_____
(Interviews are not regularly required for admission. Applicants will be contacted if a department or program wishes to schedule an interview.)

S. **References: Please record the names of the three (3) persons to whom you have sent the recommendation forms. Check if enclosed.**
Name and Title

1. ☐ _____

2. ☐ _____

3. ☐ _____

T. **Admission Test Requirements:** Please read the Application Instructions for information on the Graduate Record Examination requirement. Foreign students from countries whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Give the date on which you have taken or expect to take the GRE, TOEFL, or other test.

☐ GRE ___ ___ ___ ___ ___ ___ ☐ TOEFL ___ ___ ___ ___ ___ ___
month day year month day year

Send notarized or official photocopies of score reports if available.

U. Statement of Objectives and Plans

Please indicate your reasons for wishing to enroll in the degree program and department you specified on page 7a and indicate your plans for work after completing a program at this School. Please type your statement and *limit it to this page.* It is important that you be as specific and concise as possible. A curriculum vitae may be included with your application but may not serve as a substitute for this statement of objectives and plans.

If you are applying to the programs in Health Policy and Management or Health Services Administration, please describe a situation (or job) in which you felt you had some responsibility and tell us what you learned from that experience. Please type your statement and limit it to this page.

Harvard School of Public Health
677 Huntington Avenue
Boston, MA 02115

Please type or print

Application for Financial Assistance for the Academic Year 1985–1986

U.S. Citizens and Permanent Residents Only

Every question must be answered fully. Use typewriter or pen.

1. Name in full _____
(Please Print) (Last) (First) (Middle)

2. Local Address _____
(Street and number) (City) (State) (Zip Code)

3. Permanent Address _____
(Street and number) (City) (State) (Zip Code)

3a. Resident of Permanent Address since _____ (Mo./Yr.)

4. Date of Birth ____/____/____ Mo. / Day / Yr.

5. Citizenship _____ Permanent Residents of U.S. list Visa No. _____ Classification _____

6. Single Married No. and age of children _____

		Yes	No		Yes	No
7. Did or will you live with your parents for more than six weeks (42 days)	..in 1984?	☐	☐	..in 1985?	☐	☐
8. Did or will your parents claim you as a U.S. income tax exemption	..in 1984?	☐	☐	..in 1985?	☐	☐
9. Did or will you get more than $750 worth of support from your parents	..in 1984?	☐	☐	..in 1985?	☐	☐

10. Indicate program to which you are applying and intended enrollment status: Full-time ☐ Half-time ☐

Degree Program	Department/Program	Enrollment date(s)
☐ Master of Public Health		
☐ Master of Occupational Health		
☐ Master of Science		
☐ Doctor of Public Health		
☐ Doctor of Science		

11. Anticipated date of graduation _____

12. Please indicate any special circumstances affecting family support _____

13. Career Objectives _____

14. Date GAPSFAS filed
Note: The GAPSFAS is required of all applicants for Financial Aid with the parental section completed for those who answered "yes" to questions no. 7, 8, or 9 and all applicants under age 25.

Signed _____ Date _____

Please return to M. C. Salmon, Director of Financial Aid, at the above address.

The School of Public Health is not in a position to provide financial aid to foreign students since our major source of support is through our federal government and foreign nationals are ineligible. You can contact the following agencies, since they have supported many of our students in the past:

United Nations Office of Public
Information for Graduate Study
New York, NY 10017

Ford Foundation
320 East 43rd Street
New York, NY 10017

Rockefeller Foundation
1133 Avenue of the Americas
New York, NY 10036

The Afro-American Institute
833 United Nations Plaza
New York, NY 10017

World Health Organization
112 Geneva 27
Switzerland

Please note that the deadline date for receipt of completed applications for the above agencies is usually about November 1 of each year for the following academic year.

In addition, the Committee on General Scholarships of Harvard University administers the following scholarships designated for citizens of foreign countries:

Australia	– Sir Robert Gordon Menzies Scholarship
Belgium	– Frank Boas Scholarship Fund
China (Including Taiwan)	– Arthur Theodore Lyman and Henry Sturgis Grew Scholarships
France	– Madame Marguerite Carriere Fellowship Fund
	– Jean Gaillard Memorial Fellowship
	– Augustus Clifford Tower Fellowship Fund
Pacific Region	– Peter Brooks Saltonstall '43 Memorial Fund
United Kingdom, including students from British Commonwealth Countries:	
	– Frank Knox Memorial Fund (does not support post-doctoral students)
Yugoslavia	– Zlatko and Joyce Balokovic Scholarship Fund
Muslims	– The Aga Khan Scholarship

Should you wish additional information on the above scholarships, please contact Margaret C. Salmon, Director of Financial Aid at the Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115. The deadline for completed applications for review by the Committee on General Scholarships is about March 1 of each year.

Admissions Office
Harvard School of Public Health
677 Huntington Avenue
Boston, MA 02115

Please type or print

Recommendation Form

To the applicant: Please fill out the upper portion of the Recommendation Form and forward it to a college or graduate school instructor or to a person who is familiar with your professional work. Ask your recommender to enclose the form he/she has completed in a self-addressed envelope which you will provide, seal the envelope, sign across the seal, and return to you. Do not open this envelope or break the seal. Submit the sealed envelope with your application.

Applicant's Name _____

Program and Degree for Which You Are Applying _____

Name of Individual Completing Recommendation Form _____

I have read the Recommendation Section of the attached Application Instructions and understand that federal legislation provides me with a right of access to this recommendation if I am admitted and register as a student at the Harvard School of Public Health. Furthermore, I understand that I may waive the right of access to this material, but that no school or person can require me to do so. If I waive access, these recommendation forms may be used only by this School's Admissions Committee this year, and may not be duplicated.

SIGN THE FOLLOWING STATEMENT ONLY IF YOU WISH TO WAIVE THIS RIGHT OF ACCESS.

I hereby waive my right of access to this recommendation and authorize the above individual to provide a candid evaluation and all relevant information to the Harvard School of Public Health.

Applicant's Signature _____ Date _____

To the Person Completing the Recommendation Form: The Harvard School of Public Health's Committee on Admissions and Degrees will appreciate your writing us as fully as you can concerning the candidate, saying how well and in what capacity you have known him/her and frankly stating deficiencies as well as merits. We would particularly appreciate your frank opinion of the applicant's abilities to undertake graduate study and of his/her suitability for a career in the health field.

If the applicant has not waived the right of access to this evaluation by signing the waiver statement above, we wish to point out that he/she may ask to review it after admission and enrollment at the Harvard School of Public Health.

Please complete the recommendation and mail it to the applicant in the envelope which the applicant has provided. Please seal and sign the back flap of the envelope; the recommendation will be submitted unopened by the candidate with his/her application. Thank you.

1. How long have you known the applicant and in what connection?

2. What do you consider to be the applicant's strengths and talents?

(see other side)

3. What do you consider to be the applicant's weaknesses?

4. How well do you think the applicant has considered plans for graduate study, and will this study be of value in his/her development in the field of public health?

5. If English is not the applicant's native language, is his/her written and oral English at a level suitable for success in a rigorous graduate program and in a professional career?

6. Many courses at the School are heavily quantitative and require advanced mathematical ability. How well does this applicant use quantitative information?

7. Please rate the applicant in comparison with others applying for professional graduate education in the specified degree program.

	Top 1%	Top 5%	Top 20%	Top 50%	Below 50%	Unable to Assess
Native intellectual ability						
Breadth of general knowledge						
Ability to work with others						
Quantitative ability						
Analytical ability						
Promise as a public health professional						
Promise as a researcher						
Emotional maturity						

Please make any additional comments about the applicant's record, potential, or personal qualities which you feel would be helpful to the Admissions Committee. We are especially interested in anything that you might add that would not be otherwise apparent in the candidate's record.

Recommender's Signature _____ / Date _____

Title _____ / School or Firm _____

Address _____
Street City State Zip code

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Boston, MA 02115

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Promise as a public health professional						
Promise as a researcher						
Emotional maturity						

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